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DIESEL RAILWAY TRACTION

The August issue of this RAILWAY GAZETTE publication, illustrating and describing developments in Diesel Railway Traction, will be ready on August 1, price 2s.

Railway Subsidies

STRONG support for the views expressed in an editorial article in our last week's issue against the desirability of a subsidy for British Railways is contained in a letter published on another page this week. The writer of the letter is Mr. John Elliot, who, although he is Chief Regional Officer of the London Midland Region, British Railways, does not write in that capacity, but as a railway officer whose experience has been broader than many, and who has had an opportunity of seeing at first hand railway operation and administration in several parts of the world. It will be recalled that our condemnation of the principle of a subsidy for railways arose because of a speech advocating such a course made by Lord Bruce of Melbourne. Appositely enough, Mr. Elliot cites in support of his opposition to the idea of a subsidy conditions on the Victorian Railways, which he visited last year and on

which he prepared an exhaustive report. That report was the subject of editorial comment in our August 5, 1949, issue, and it has been widely quoted as an excellent survey of the position in Victoria as well as a guide to railway practice and administration elsewhere. Mr. Elliot shares our view that railways should be as self-sufficient as any other industry and that they should be separated from the State budget. Moreover, he emphasises in rather different words, the proposition we made. This was that if certain users of transport should be given assistance from the State, the subsidy should be paid to the organisations, trades or individuals supposed to need it. The report on the Victorian Railways put the matter more strongly in the following words: "The services which it (the railway) provides should be paid for in full by those industries and those people who use them (so ensuring that the true cost of transport service to the community is not masked), and that its charges shall be sufficient to provide not only for the operating costs of service but for adequate annual charges against revenue for renewals . . . There is no more reason for transport services to be provided at an overall loss than for any other essential commodity. Muddled economy and semi-bankrupt transport can be the only result of such a policy." It is satisfactory to note from Mr. Elliot's letter that since the publication of his report, considerable strides have been made in Australia away from the principle of subsidising industry through ridiculously low rail rates. It would be disastrous to British Railways and the national transport system of this country if the lesson which has been learned in Australia were to be disregarded here as a result of no doubt well-intentioned but obviously ill-informed suggestions that the problem facing British Railways could be in any way helped by a subsidy. We have no doubt whatever, and we believe that practical railwaymen throughout the world would share our view, that far from helping to solve the economic difficulty of British Railways, a subsidy would intensify it.

Mr. W. H. Maass

THE return to duty in South Africa of Mr. W. H. Maass will be regretted by many who have come to have a high regard for him since he joined the staff of the office of the High Commissioner for South Africa in London. It is nearly twenty years since Mr. Maass first came to England. For three years from 1931 he served on the staff of the Advisory Engineer at the High Commissioner's Office and then, after three years in the Union, he came back here as Acting Assistant Advisory Engineer. From 1941 to 1945 he was Acting Advisory Engineer and during the war years, he was the High Commissioner's Technical Representative on the Commonwealth Supply Council (Railway Equipment) established by the Ministry of Production for the purpose of dealing with priorities and advising on the allocation of available capacity for the production of rolling stock. In 1946 he went to South Africa as Mechanical Engineer (East London) and on his return to South Africa House in January, 1949, as Advisory Engineer his appointment was warmly welcomed. Mr. Maass is well known to representatives of a wide range of British railway engineering industries. His courtesy and helpfulness has earned him friendship and high esteem. The good wishes he is receiving on his present departure from that office will also be extended to his successor, Mr. G. J. A. Lindenberg.

The Place of Railways in Colonial Development

IN the report of the Colonial Development Corporation for the year ended December 31, 1949, it is pointed out that, when achieved, the projects for railway extension in East and Central Africa now under consideration, and which it is hoped will link the East African and Rhodesian railways, will greatly accelerate the rate of development possible in the inland areas. The experience gained in operating a convoy over earth roads from Lindi, the port in Southern Tanganyika, to Northern Nyasaland, shows, however, that in some instances development need not

always await the construction of new railways and all-weather roads. In Uganda, it is probable that large-scale development will take place only after the projected railway extensions have taken place, as at present the high cost of transport would more than offset the advantage of cheap power generated by the Owen Falls hydro-electric plant, when this scheme is completed. In his concluding statement in the report, Lord Trefgarne, Chairman of the Corporation, states that the provision of ports, roads and railways, schools, and hospitals is the foundation on which must be built the agricultural and industrial activities which will raise the level of production, living standards, and exports of the colonies.

The Railways of Korea

FOR several centuries Korea was a hermit kingdom, but first Tsarist Russian and then Japanese expansion forced it out of its isolation. Ironically, in view of the present conflict, it was under American auspices that the first railway in the country was promoted in 1895. Military necessity in the Russo-Japanese war of 1905, prompted the Japanese, who by then had gained considerable influence in Korea and were soon to annex it, to push ahead rapidly with railway building. The development of the railway system, which the Japanese brought to a high degree of efficiency, is recounted in an article in this week's issue. On the main line from Fusan (Pusan) to Seoul, according to the 1939 timetable, the fastest train took 6½ hr. for the 280 miles, with two intermediate stops, over a single line. There were through trains to, and connections with, the South Manchurian system, and a steamer service to Shimonoseki, in Japan. It is said that Japanese imperialism even aspired to a tunnel under the 120-mile Tsushima straits between Japan and Korea as part of a grandiose plan to link Japan by a rail line of communication through Korea, Manchuria, China, Indo-China, and Siam to Malaya, all within its "co-prosperity sphere"!

Railway Unification in Scotland

ALTHOUGH actual methods of working traffic can never be constant, because of continual changes in the flow of traffic, unification is providing British Railways with a number of possibilities for improvement. These are enlarged on by Mr. H. G. Sayers, Operating Superintendent of the Scottish Region, writing in the July issue of the Scottish Region edition of the *British Railways Magazine*. The progress already made, states Mr. Sayers, can now be measured by the fact that the average weekly mileage worked in Scotland by fitted and partially fitted freight services rose from about 79,000 miles at the beginning of 1948 to 96,000 miles in February this year. This was achieved largely by concentrating divided streams of traffic on particular routes, which had resulted in trains being made up to more distant places, and in running at higher speeds. Freight train speeds, indeed, had shown a small, though steady, increase during the past three years, while many improvements had been made also in passenger train services, the booked journey time of no less than 60 per cent. of those trains local to the Scottish Region having been restored to the high standard of running obtaining before the war.

Swiss Speed Enterprise

TO those unacquainted with modern railway development in Switzerland, but conversant with the extremely mountainous nature of that country, it may come as a surprise that 18 daily runs on the Swiss Federal Railways are scheduled at from 60 to 69 m.p.h. from start to stop, or that trains up to 12 cars of 70 ft. in length can be moved at speeds up to 82 m.p.h. by electric locomotives weighing no more than 55½ tons. Even more noteworthy, perhaps, is the fact that a heavy sleeping car express can make a non-stop run of 105½ miles through the heart of the Alps; and that the locomotives used, despite having to lift their trains by steep gradients through a difference in

level of 3,028 ft. and severe restraints on speed on the corresponding descent, can complete the journey at an average speed of 43.4 m.p.h. Elsewhere in this issue an article pays a tribute to the speed enterprise of the Swiss Federal Railways and the associated smaller lines, as expressed in the 1950 summer timetables. A notable feature is that 14 lightweight expresses, seven each way daily, link Geneva with Zurich at a combined average speed of 50 m.p.h. across the country, stops included. Details are given of runs on these trains, one of which shows the ability of one of the 55½-ton "Re 4/4" electric locomotives to make a run at 70 m.p.h. from start to stop with a 360-ton load.

Gauge of 500 Route-Miles to be Narrowed

NOT since the broad-gauge to standard-gauge conversion on the former Great Western Railway has the railway historian had to record a wholesale reduction of gauge on a railway system—at any rate in peacetime. Now, however, this unusual phenomenon is to be repeated in East Pakistan, where the 500-mile 5 ft. 6 in. gauge section of the Eastern Bengal Railway is to be converted to metre (3 ft. 3½ in.) gauge. The differences between these two gauge reductions are that on the Great Western neither speed nor vehicle capacity was appreciably curtailed, whereas on the Eastern Bengal speed, and to a greater extent vehicle and train capacity, are likely to be considerably lower. Latest available Indian figures show an average load carried by broad-gauge goods trains as 470 tons, whereas the corresponding figure for metre-gauge lines is only 175 tons. Reduction of speed will also adversely affect ability to compete successfully with road traffic, both passenger and goods, making wagon turnaround slower. However, with 1,100 miles of metre gauge, the administration and Pakistan Government evidently consider that uniformity of that gauge outweighs any such objections to conversion. The seaport of East Pakistan is Chittagong, served by metre gauge only; and the situation of Calcutta on the Indian side of the new frontier renders largely useless any broad-gauge connection between that port and East Pakistan.

Rehabilitation of East Coast Main Line

SINCE the major disaster that befell Anglo-Scottish communications in August, 1948, when traffic over the Berwick-Edinburgh section of the East Coast route was entirely disrupted by floods and wash-aways for about two months, the engineers have had their hands full in repairing the damage. They first contrived and completed first-aid repairs with the aid of that invaluable equipment perfected during the war, military-type steel trestling and girder spans. This enabled the flow of traffic to be resumed at slow speeds over the several temporary structures in the shape of bridges and embankments. Now, however, they have completed permanent bridges and retaining walls and so enabled all the restrictions except one—depending on the consolidation of an embankment round a new culvert—to be removed. The new bridges consist of concrete abutments and wings and of deck girder spans, except at one river crossing, where headway demanded a through-type span. The culvert mentioned above is 200 ft. long, and the retaining walling supports a bank high above the foreshore of the coast. All this work, which is described elsewhere in this issue, has been done under traffic without appreciable diversion of the tracks, and the excellent job completed does great credit to engineers, contractors and staff alike.

12,000 Diesels in the U.S.A

BY the end of 1949 the number of diesel-electric units in service on the Class 1 railways of the United States totalled 10,973, with an aggregate of 14,009,850 b.h.p. A further 1,023 units—bringing the grand total to almost 12,000—were at work on Class II and III railways. The Atchison, Topeka & Santa Fe Railroad leads the way with 864 units, and is closely followed by the Pennsylvania, with

828. The Norfolk & Western Railway, with its highly developed steam power, is the only remaining major railway that has not fallen before the diesel advance. In all, 16 Class I railways, the biggest of them the Gulf, Mobile & Ohio, with 2,905 route-miles of line, are now completely dieselised, while many others are rapidly approaching the same state. Elsewhere in the U.S.A. dieselisation is proceeding by well-defined stages in which steam power is being replaced by diesels over whole divisions. Orders on manufacturers for new units continue to be placed. An interesting situation has been created by the success of the single-unit experimental Alco-G.E. gas-turbine-electric locomotive on the Union Pacific Railroad. The claim is made that this equals the haulage capacity of a triple-unit diesel of 4,500 b.h.p. or an articulated 4-6-6-4 steam locomotive and that its maintenance costs to date have been considerably lower than those of its rivals.

A Fortunate Escape

THE passengers in the train from Edinburgh to London on June 23, 1949, in which fire broke out in the tenth vehicle, completely gutting it and that next in advance, had a narrow escape. As will be seen from Colonel R. J. Walker's report on the occurrence, summarised in this issue, the train was by good fortune pulled up quickly, in time to prevent the vehicles concerned passing completely into the Penmanshiel tunnel, and excellent team work on the part of the crew resulted in their being equally quickly isolated from the rest. A little difference in the circumstances would have led inevitably to the gravest consequences, for the fire obtained a complete hold on the coaches in an incredibly short space of time. Conditions in a moving train are necessarily conducive to the rapid spread of a fire, and too much attention cannot be paid by those concerned to the facts emerging from the Report, and to the serious remarks and recommendations which Colonel Walker has considered it his duty to make in it. The lesson of this particular case must be taken thoroughly to heart by all concerned.

Increased Productivity

DURING the first five months of the current year production as measured by the Government interim index was 9 per cent. higher than in the corresponding period of 1949. Installation of new capital equipment was one of the main factors in achieving this improvement. Output of vehicles increased by 21 per cent., and engineering, shipbuilding, and electrical goods by 5 per cent., whereas the number of workers employed in industries covered by the interim index of industrial production rose by less than 2 per cent. during the period. On this basis it is assumed that productivity has risen at the rate of about 7 per cent., which compares with an increase of 5½ per cent. in 1949 over 1948, and with the assumption in the Economic Survey that the rate of increase in 1950 would be 3½ per cent.

Mr. Hugh Gaitskell, Minister of State for Economic Affairs, stated at a press conference last Tuesday that, though at first sight it would seem the best thing was to increase our investment programme, we could not increase its scale at a given level of productivity without consuming less or exporting less. That would be the only way to release the manpower, materials, and other resources which would be needed for the increased investment. The amount of investment taking place in this country, claimed Mr. Gaitskell, was at least as high as in the best pre-war year, allowing for price changes, and certainly far above the average pre-war level.

The main purpose of the capital investment programme had been increased productivity. Combined with the application of existing technical knowledge, and the application of new technical advances as they came along, it had been a major factor in making possible an increase in output per man. All the Anglo-American productivity reports had emphasised that for higher productivity far

more capital per worker is needed and that the amount of capital per worker in the United Kingdom was lower than in the United States.

Of the £2,200 million which was expected to be spent this year on gross investment in fixed capital assets, excluding additions to stock and work in progress, about 20 per cent. was being devoted to the manufacturing industry, including iron and steel. About 10 per cent.—roughly £235 million—would be spent in the fuel and power industries, approximately half this amount for electricity, with the rest divided between coal and coke, gas and petroleum.

Another major sector of the programme was transport and communications, on which 15 per cent. of the total—about £320 million—was being spent this year. About 25 per cent. of the total was being invested in housing and the social services, whereas before the war the proportion was over 33½ per cent.

Wages, Prices, and Profits

WHEN the Labour Party holds its forty-ninth annual conference at Margate in October, wages, prices, and profits will form the major subjects for discussion. The preliminary agenda has been published, but the possibility cannot be ruled out that because of the impact on Great Britain's economic policy of the outbreak of fighting in Korea, it may be necessary to modify it by the time the Margate meetings commence.

Many of the resolutions are in favour of bringing to an end the wage restraint policy of the Government, but at the same time demands are made for more effective ministerial control of prices and profits. The National Union of Railwaymen, for example, notes with regret the "ineffective efforts" of the Government to stem the upward trend of prices, and after referring to the high rate of profit, calls for more energetic action to ensure a reduction in prices and the rate of profit. It is reasonable for any trade union to endeavour to secure higher rates of pay and improved conditions of work for its members; that indeed should be the primary function of a trade union. Nevertheless, the inconsistency of advocating increased wages and at the same time, calling for a reduction in prices, does not seem to be apparent to those who have framed the resolutions for the Margate conference. In the case of the railways, in particular, increases in wages must be reflected ultimately in either a higher price for transport services or a greater loss by the British Transport Commission. If the former, the impact on the general price-level must be both widespread and accumulative, for the cost of transport enters at one or more points into the price of all raw materials and again into that of the finished article. Indeed, in a majority of cases, transport charges in the aggregate form a very considerable part of the total costs of the finished product.

On the other hand, if advances in the pay of railwaymen are not to be passed on to the user of transport in the form of higher charges, there are only two courses which can be adopted. The higher wages, theoretically, might be absorbed by economies. That is in the highest degree unlikely of achievement in any foreseeable circumstances, largely because wages themselves are so preponderating a part of the railways' total expenditure. They account for two-thirds of railway expenses. The most fruitful field of railway economy under a unified system should be in the labour bill, either by being able to merge certain functions, so as to achieve the same efficiency of operation with a smaller number of men, or, more especially, by the greater introduction of mechanical handling and other labour-saving devices which would enable the total labour force to be reduced. If such a policy were vigorously adopted, and energetically supported by the trade unions, a position might well be reached at which it was possible to pay better individual wages to a much smaller number of men without upsetting the railway economy and without the risks involved to the general trade and commerce of the country of a resort to higher charges. There is, however, little

indication that the trade unions in this country are prepared to take the necessarily broad view on this matter.

If higher wages for railwaymen are to be granted at the expense of increasing the deficit of the British Transport Commission, the time when an efficient and economic system of inland transport, as envisaged under the Act, can be achieved, must be placed in the dim future. In any event, once the idea became accepted that, for any reason, the operation of British transport at a loss was to be a permanent or semi-permanent feature, a great incentive to efficiency and economy would be lost, and there would be a deterioration not only in the morale of management and men, but equally in the services afforded to the public and to industry. The deficit itself ultimately would have to be made good by the taxpayer and this would in effect constitute a subsidy for the railwaymen, or trade and industry, or both.

Ceylon Government Railway

THE annual report of the Ceylon Government Railway, of which Mr. M. Kanagasabay is General Manager, shows that for the financial year ended September 30, 1949, the undertaking has, as in the two previous years, incurred a loss in working; this amounts in the year under review to Rs. 16,167,275 or a total deficit including interest and annuities payable of Rs. 21,074,545. The deficit was less by Rs. 1,595,223 than that of the previous year. Working expenses rose by Rs. 382,904, but additional costs were more than offset by a revenue increase of Rs. 2,609,977. Revenue amounted to Rs. 55,078,332; of this, nearly 45 per cent., or Rs. 24,324,356, was derived from goods, and 45 per cent. or Rs. 25,013,171, from passenger traffic. Of the expenditure of Rs. 71,245,607, some 50 per cent., or Rs. 38,414,606, was for wages and salaries, and 20 per cent., or Rs. 13,673,372 for fuel. Although traffic has been on the increase for the past three years, the heavy loss on working persists, due to mounting expenditure on salaries and on materials and equipment.

Some principal figures for the year under review and previous years are:—

Year	Revenue Rs.	Expenditure Rs.	Working cost per train-mile Rs. Cts.
1941-42	28,302,436	24,439,334	5 80
1942-43	39,693,952	28,880,704	8 30
1943-44	52,010,771	32,218,329	9 5
1944-45	59,592,041	39,746,454	10 59
1945-46	56,308,688	52,097,685	12 54
1946-47	48,349,070	62,847,052	14 15
1947-48	52,468,355	70,862,703	13 86
1948-49	55,078,332	71,245,607	12 87

Third class fares, which had been raised by only 14 per cent. during the war, were further increased, bringing them to roughly the same level as bus fares. Workmen's fares, which were absurdly low, were raised to the level of ordinary third class fares. The concession rates for paddy, rice, fruit, vegetables and other local produce, which had been introduced to foster local enterprise, were not withdrawn. The rate increases effected met with some success, but were inadequate to bridge the great gap between revenue and expenditure. First and second class passenger earnings continued to fall, and goods traffic showed no great improvement. Proposals for a revision of freight rates and a new goods classification have since been approved by the Government, and are expected to result in a substantial increase in revenue.

The railway has to carry much low-rated traffic such as straw and manure, which is not usually sent by road if railway facilities are available. It must also carry small consignments involving multiple handing and much clerical work. This cannot be done without financial loss unless the railway is also given a fair share of the more remunerative traffic.

Mr. Kanagasabay therefore suggests, in the interests of the community, a fair re-distribution of traffic between road and rail. Without this re-distribution, more capital will be invested in the transport system than is needed to deal with the traffic, which causes redundancy of transport, waste of capital, and loss to the country. The Adviser on Transport Conditions to the Ceylon Government dealt with this problem in his reports which were the subject of articles in *The Railway Gazette*, April 8 and

May 6, 1949, issues. It is hoped that measures taken as a result of these various recommendations will result in a radical solution.

By publishing statistics of the earnings, expenses, and capital of the railway for the 84 years of its existence, Mr. Kanagasabay shows that it has not been a heavy burden on the finances of the country. After meeting the losses sustained during certain years before and after the last war, the net profits amounted to Rs. 230,239,758. This figure excludes free transport on behalf of the Government before 1928, and provision of Rs. 26,418,150 for a deferred maintenance reserve fund. The capital invested by the Government in the railway was Rs. 236,108,947 on September 30, 1949. In effect, the railway has repaid the government in the shape of profits amounting to almost its entire capital; but if the railway capital is revalued, the present capital value will be more than double the book value of Rs. 236,108,947.

Despite a decrease in the number of locomotives, carriages and wagons in service, and the non delivery of any new rolling stock on order, a faster and more intensive train service was put into operation; train mileage increased from 5,292,926 in 1948 to 5,670,315. There was an improvement in the timekeeping of trains and quicker turn-round and more intensive use of wagons. Renovation of all carriages under a special programme was completed during the period under review and the output of locomotive and wagon repairs and local manufacture of spares increased.

Interstate Commerce Commission, U.S.A.

FOR 63 years the Interstate Commerce Commission has regulated the U.S.A. railways. Originally Congress set up the Commission to protect the public against abuses which discredited the era of railway monopoly in long-distance transport. With the passing of the years, Congress strengthened the Commission's powers over railway development and extended its jurisdiction to cover over 3,000 road motor carriers, 177 inland waterways, and 69 pipe lines. Today the Commission combines many of the functions of our Ministry of Transport and Transport Tribunal. Like our Ministry, it does not control air transport. In the realm of surface transport its authority centres on:—

- (i) rates, charges and conditions of carriage;
- (ii) financial and accounting practices;
- (iii) the supply of adequate facilities;
- (iv) the starting and abandonment of services;
- (v) the safety of operations.

The Commission has 11 members, who appoint one of their number to act as chairman in rotation. A permanent secretary administers a mass of general business, spread over 15 bureaux. The establishment costs \$11,000,000 a year.

Of late the Commission has been subject to keen criticism from several angles. A growing volume of opinion in the States holds that its regulatory methods are outmoded in times when other types of transport are drawing off much high-class traffic from the railways. For example, the Commission is deemed to have been too slow in approving increased railway rates and fares to meet the rise in operating costs after the war. Recently charges have been reviewed with greater dispatch, but over the past 20 years have not been adjusted suitably to yield the railways a fair return on property investment. Yet in that period the Government has subsidised, either directly or indirectly, road, water and air carriers on a lavish scale. Through this conflict of policies, the financial standing of the railways has been weakened so seriously that an uneasy feeling exists in some quarters about the future of free enterprise in transport.

The difficulties besetting the U.S.A. railways are admitted in the 63rd annual report of the Interstate Commerce Commission, covering the period from November, 1948, to October, 1949. The report stresses the need for achieving lower railway operating costs through greater efficiency, largely because advances in rates tend to extract more revenue from some traffic for less volume of service.

The report acknowledges, rather grudgingly, the improved operating results, which we have discussed in several articles as statistics for 1947-48 and 49 came to hand. The Commission views the problem as "one involving the whole gamut of railroad operations and as requiring the wholehearted co-operation of employees." The obvious comment is that the Commission's own requirements often tend to raise working costs, while the railway staff press demands for higher pay and better conditions of employment without any regard for the ability of the railway industry to foot the bill.

Before our railways came under Government control in 1939, the Ministry of Transport hardly ever intervened in matters of day-to-day management. In contrast, the Interstate Commerce Commission is apt to magnify its office and interfere more than is necessary in the conduct of railway operations, while admitting in its report that some of its duties are performed in a somewhat perfunctory manner, owing generally to shortage of staff. Electronics supply a good example. The Commission seeks power to require any railway to instal telegraph, telephone, radio, inductive, or other wayside or train-communication system. The reason put forward is the promotion of safety, but the use of electronics in railway working is at an experimental stage, and the speeding up of movement was the primary justification for the trials which some of the companies are making. The railways' safety record is remarkably good, compared with the risks of either road or air transport. In 1948 private motor-cars were involved in 3,543 accidents at highway grade crossings, in which 1,355 people were killed and over 4,000 injured. In 50 cases trains were derailed in collisions with motor-cars, but the Commission merely reports these facts without suggesting any remedy. There are, to be sure, 226,800 level crossings in the States and some 40,000,000 motor-cars, but the Commission appears to have given a disproportionate amount of attention to train accidents, which caused no more than 80 fatal casualties.

One of the most valuable activities of the Commission is the issue of monthly, quarterly and annual publications, prepared by its Bureau of Transport Economics and Statistics. These studies, based on reports from the various carrying agencies, keep the American people advised of current developments in transport. Compared with these up-to-date analytical statements, the annual reports of the Commission are catalogues of past happenings, but constitute a useful series of books for reference.

British Locomotive Exports

FOR the first six months of the current year the Board of Trade returns show a decrease in the number and value of locomotives exported from Great Britain as compared with the same period a year ago. The shipment of main-line locomotives to the end of June, 1950, totalled 154 of a value of £3,336,624, which compares with 176 for the first half of 1949, totalling in value £3,917,096, though the latest return still shows a considerable increase over the first half of 1948. Then the total value of shipments was £2,832,750 as compared with only £788,790 for the first half of 1938. This year so far a total of 55 main-line engines valued at £1,084,313 has been shipped to India. This figure is of special interest for the reason that, though the total value of locomotive exports shows a decrease for the period under review, the shipments to India show an increase of £745,001 in value and of 37 in number over the corresponding period last year. Exports of locomotives to India in the first six months of 1948 were £233,244 less than in the first half of 1949. Australia is shown as having imported from Great Britain during the six months 28 main-line locomotives valued at £539,320. For the corresponding periods of 1949 and 1948 the numbers were nil. The value of locomotives shipped to South Africa this year, £92,006, has decreased from £858,879 in the first six months of 1949, and from £1,217,484 in the first half of 1948. There were no shipments of main-line locomotives to Argentina during the period under review. Argentina figured in the 1949 records with 27 locomotives valued at £558,985.

The export of carriages complete in the first half of the current year was valued at £1,113,527 as compared with £1,096,820 in the first half of 1949 and £360,488 in the corresponding period of 1948. Wagon shipments this year have continued at a high level and increased from £1,931,479 to £2,245,110. Wagon shipments to India, £490,292 in value against £143,060, were very largely responsible for the total increase in the value of these exports. Parts for locomotives, except tyres, wheels, axles, etc., showed a slight increase in value at £1,554,597 in the latest return. For carriages they were £732,670, or slightly less than twelve months ago, while in the case of wagons, parts shipped totalled £1,483,826 as compared with £1,440,914. The export of wheels and axles has brought in £947,703 as compared with £1,072,727. Other parts totalled £1,447,214 against £1,129,275.

British exports in six months ended June 30, 1950 (countries)	Locomotives			Carriages (including parts)			Wagons		
	1950	1949	1948	1950	1949	1948	1950	1949	1948
	£	£	£	£	£	£	£	£	£
British West Africa ...	229,991	585,561	410,304	170,494	104,761	2,306	532,381	360,463	170,229
Union of South Africa ...	92,006	858,879	1,217,484	934,075	960,007	81,057	716,017	691,758	51,698
Southern Rhodesia ...	450,000	510,000	30,000	—	—	—	466,566	727,223	175,770
British East Africa ...	92,043	187,567	—	—	—	—	—	—	—
India ...	1,084,313	339,312	106,068	—	—	—	490,292	143,060	56,226
Malaya ...	—	—	—	—	—	—	87,532	65,896	335,753
Australia ...	539,320	—	—	—	—	—	—	—	—
New Zealand ...	—	—	—	235,162	231,074	5,051	54,023	3,005	680,703
Canada ...	—	—	—	—	—	—	—	—	—
Other Commonwealth countries and the Irish Republic ...	17,175	18,582	313,701	136,209	150,918	126,756	674,088	280,378	109,894
Burma ...	—	78,190	483,967	—	—	—	44,676	19,586	358,765
Argentine Republic ...	—	558,985	—	—	—	—	664,690	375,088	28,529
Egypt ...	—	—	—	92,482	105,189	149,509	23,002	401,653	79,749
Iraq ...	—	—	—	136,266	204,556	145,732	—	—	—
Finland ...	—	—	—	—	—	—	—	—	—
Denmark ...	—	—	—	—	—	—	—	—	—
Netherlands ...	—	—	—	—	—	—	39,679	65,720	90,551
France ...	—	—	—	—	—	—	—	—	—
Brazil ...	—	—	—	—	—	—	28,315	424,910	57,135
Other foreign countries ...	831,776	780,020	271,226	141,509	187,917	144,563	311,164	211,270	128,760
Total ...	3,336,624	3,917,096	2,832,750	1,846,197	1,944,422	654,974	4,132,425	3,770,010	2,323,762
	Boilers						Wheels and axles in complete sets		
All countries ...	219,142	221,428	166,319	—	—	—	947,703	1,072,727	906,189
	Other parts						Other parts		
All countries ...	1,554,597	1,411,914	940,646	—	—	—	1,447,214	1,129,275	978,229

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Station Announcers

July 13

SIR,—I must protest with all vigour against the statement by Mr. Collins in your issue of July 7 that station announcers have now outlived their usefulness.

Let him spend a while on the crowded platforms of a busy Southern Region suburban junction in the peak hour, with trains arriving and departing every two minutes, and he will soon realise the value to staff and passengers alike of a good announcer.

Much has been written concerning the raucous voices of certain male announcers, and while that is undoubtedly sometimes true, my general experience has been much to the contrary. A concisely-worded and distinctly-pronounced announcement (particularly when normal running is interrupted) is a joy to hear and far less irritating than the voices of several lusty-throated porters. It is when the porters endeavour to compete with their colleague at the microphone that the real trouble arises.

It appears to me that the requirements of a loud-speaker announcement are accuracy, conciseness, clarity, and careful timing. One might suppose that the first could be taken for granted, yet I am frequently reminded of the winter train service by one announcer who appears not yet to have discovered that the running of a certain service of Sunday trains was altered on June 5 last. As for the others, it is surely a matter of training and practice.

Yours faithfully,
C. F. WELLS

Deanscroft, Walton-on-the-Hill

Railway Subsidies

July 25

SIR,—I have read your leading article in last week's issue on the speech which Lord Bruce of Melbourne made recently in the House of Lords, in the course of which I understand he advocated that the railways should be subsidised rather than be permitted to raise their rates so as to have a reasonable relation to the costs of providing rail service. I agree with every word you have said in condemnation of this idea.

Lord Bruce comes from a British Dominion where the railways have been bedevilled by political interference, largely because they have been subsidised by the Government, and therefore at its mercy.

In my report on transport in Victoria last year, following my visit to that State at the request of the Victorian Government (extracts from which you were good enough to report in one of your issues at the time), I laid emphasis on this aspect of the matter.

I wrote: "The only sound and lasting basis for transport service, on which both industry and the public alike depend, is that it should be as impartial as possible, as all-embracing as possible, as efficient as possible, and as self-sufficient as any other industry; above all that it should be separated from the State budget, and so from political 'ups' and 'downs' which rarely, if ever, have any logical connection with it. The physical state of transport will otherwise be dependent on the outlook and difficulties of the State Treasury (as has for so long been the case with the Victorian Railways).

"The services which it provides should be paid for in full by those industries and those people who use them (so ensuring that the true cost of transport service to the community is not masked), and that its charges shall be sufficient to provide not only for the operating costs of service, but for adequate annual charges against revenue for renewals. There are always plenty of voices demanding that transport rates should be lowered, or kept low, to benefit this industry or that section of the community. This is illogical, and, if listened to, will render a lasting solution impossible. There is no more reason for transport services to be provided at an over-all loss than for

any other essential commodity. Muddled economy and semi-bankrupt transport can be the only result of such a policy. It is always open to any Government to assist a particular industry, in the national interest, by means of an open subsidy; it cannot be in the national interest for one vital industry to subsidise another, and destroy its efficiency in the process of doing it."

Since the publication of my report by the Government of Victoria, considerable strides have been made away from the bad principle of subsidising industry through ridiculously low rail rates, which has so hampered Australian railway administrations in keeping their systems reasonably well-maintained and equipped.

It is disappointing to find so eminent an Australian as Lord Bruce advocating for this country a policy which, because of its paralyzing influence on railway efficiency, has long been discredited in his own.

Yours truly,
JOHN ELLIOT

15, Albion Street, W.2

Middlesex Passenger Services

June 28

SIR,—It is surprising that there is no direct rail service between the centre of London and London Airport. According to the map published with the article "The London Traffic Problem" in your issue of April 2, 1948, more trains could be run to and from Waterloo on the Windsor side. I suggest therefore a branch from Brentford to Heathrow, using the existing Western Region Brentford-Southall branch for about a mile. As the branch could be electrified it could pass under the airfield, with the station underground, and might be extended to serve developed areas along the London-Bath road. Fast trains could be run at regular intervals to Waterloo, where there are facilities for baggage, and good underground connections. In view of the excellent railway services radiating from Clapham Junction (which would be improved by reviving the West London passenger service) a stop there for airport trains might be considered.

Of other airports deserving rail connection, Northolt could best be served from Paddington (where there are better facilities than at Marylebone, which is rather off the map), by diesel railcars. The question is one of accommodation at Paddington. Provision of two additional running lines between Old Oak Lane and Westbourne Park seems possible; east of Westbourne Park, the difficulty might be overcome by putting the Hammersmith & City line below ground. The November 1, 1946, issue of your journal reported that a committee was considering the enlargement of Paddington Station. Developments on these lines seem necessary if an hourly service is to be run from Paddington to Birmingham, or if Eastern Region long-distance trains are ever to be diverted to Paddington to leave Marylebone free for suburban traffic.

Yours faithfully,
R. G. R. CALVERT

c/o The Westminster Bank, Broadway, Bexleyheath

The Victorian Railways

June 27

SIR,—I was most interested to observe in the April 21 issue an article on the regrading and duplication of the Gippsland main line of the Victorian Railways. There are two small errors, however, which should be corrected.

In the caption to the top illustration on page 456 it is stated "train engine running tender first . . ." Whilst technically this is the train engine, it is in actual fact the banking engine off the last up train proceeding back to Warragul light attached (as we term it) from Drouin. The reasons for operating the banking engine back in this manner are to conserve line occupation and that the design of pilot (cowcatcher) fitted to all Victorian road

engines makes it impossible to couple two engines nose-to-nose unless one or both pilots are first removed. Thus the only method, failing facilities for turning the returning banker, is to put it between the original train engine and the train, thus giving the tender-to-tender arrangement illustrated, which became most common until recently on this section.

On page 457 the author is not quite correct in saying that the "X" and "C" classes are the most powerful freight locomotives of the Victorian Railways. This remark needs the qualification "permitted to operate on the Gippsland main line." The most powerful freight locomotive is the lone "H" class 4-8-4, built, but seldom used, for passenger service. It has 55,000 lb. starting tractive effort, compared with 48,000 lb. (including booster) of the "X" class 2-8-2 and 36,000 lb. of the "C" class 2-8-0. The "X" is really a redesigned "C" suitable for conversion to standard gauge. Similarly, the "N" is a redesigned "K" similarly planned. The starting tractive effort of the "K" and "N" classes is identical at around 29,000 lb. and they are rated as identical for load-hauling purposes.

Since the date when the photographs were taken the new up line between Warragul and Drouin has been completed and opened for traffic as a single line, whilst the then-existing single line is reconstructed with altered location and gradient (to make the summit of Drouin Hill a momentum gradient for down traffic) as the new down

line. This is expected to be in operation shortly, but the elimination of banking engine working has already greatly expedited traffic. Earthworks are almost complete throughout the 18 miles from Longwarry to Yarragon, and track-laying has begun from the Yarragon end on the new formation, giving a ruling gradient of 1 in 110 against up traffic in place of the previous 1 in 50 "see-saw."

Work has also progressed for many months past further down the Gippsland line on construction of a new direct line from Moe to Yallourn which will eliminate the present route via Hens Oak and the 1 in 50 gradient through the Haunted Hills, at present necessitating a helper engine on almost every up train out of Yallourn. The new route via Yallourn will eventually be linked with the main line near Hens Oak by the time the new briquette plants at Morwell are ready for production in 1952, and eventually the whole line will be electrified, doubled, and automatically signalled from Dandenong to Traralgon (97 miles east of Melbourne by the present route). Electric locomotives of the Co-Co wheel arrangement are already on order for this project.

Yours faithfully,
JOHN L. BUCKLAND

London, W.1

[Mr. John Grimwade has also written to us pointing out that the "H" class is the most powerful goods engine in Victoria.—Ed., R.G.]

Publications Received

Tube Works Gauges & Gauging Practice. Compiled by F. W. Clark, Stewarts and Lloyds Limited, Brook House, Upper Brook Street, London, W.1. 8½ in. × 5½ in. 64 pp. Illustrated. Cloth covers. Price 5s.—This book has been compiled for the use of works trainees in conjunction with practical work. The subjects, which are dealt with on an elementary level, include the objects of gauging, the meaning of tolerances and limits, and the use of measuring instruments. Gauging of tubes is dealt with, together with the use of the appropriate instruments, and the more difficult subjects of eccentricity of tubing, with the correct methods for machining. Of interest to trainees is the section on the checking of screw-threads and the use of the optical projection machine. The appendices give a comprehensive series of terms relating to screw threads and detailed notes on tolerances and limits based on B.S. 164.

Car Builders' Cyclopaedia of American Practice. Eighteenth Edition. 1949-51. New York, U.S.A.: Simmons-Boardman Publishing Corporation, 30, Church Street, New York 7. 12 in. × 8½ in. × 1½ in. 1,308 pp. Illustrated. Price \$6.00.—The compiling of the great amount of data and information contained in this edition has entailed considerable research. The book has been revised to include the latest practice on both American railways and in American workshops introduced since the issue of the previous edition in 1946. It is divided into 19 sections, each clearly defined, a summary of the contents preceding each. Included is a general index to railway stock of all kinds, the complete vehicle and detailed parts, each with typical illustrations and diagrams, both plan and elevation being in such detail as to give an accurate picture of the trend in American design

of railway rolling stock which will be of great interest to designers and users of railway equipment. Also included is information relating to rolling stock built in America for overseas railways, and a general index to carriage and wagon parts broken down in considerable detail, and a bibliography of reports published in connection with both light and heavy repairs to all types of railway carriage and wagon equipment.

Ad Rem.—The 150th anniversary of the Butterley Co. Ltd., Ripley, Derby, occurred in 1940 and it is a matter for congratulation that there has been continuity of family interests in the firm for the whole of that period. The anniversary was not celebrated in 1940 because the country was at war. Recently the firm decided to publish its own house journal, the first number of which has just been issued, with the object of widening the interest of the employees in their work, and of bringing the customers into closer touch with the many activities of the Butterley group. Mr. E. F. Wright, Chairman & Managing Director, writes a foreword to the first issue, which is well illustrated and printed on art paper. The first article deals with the history of the Butterley group, while other articles in this first issue cover technical matters, the activities of firms with which the Butterley group does business, welfare, personal, and so on.

Motorzugförderung (Internal Combustion Railway Traction). Illustrated supplement to *Motortechnische Zeitschrift*, published by the Franksche Verlagshandlung, Stuttgart, Germany.—Germany before the war gave considerable attention to internal combustion engines for railway traction. Much was accomplished in that field, although German achievements per-

haps were overshadowed by large-scale development in America. Though the war interrupted this work it has now been resumed as far as limited resources permit. The periodical *Motortechnische-Zeitschrift* has now decided to issue again from time to time supplements devoted entirely to railway traction, and the first has now appeared, with an introduction by Dr. Frohne, Federal Ministry of Transport. With a good selection of illustrations the supplement covers a wide range of topics. The articles are mostly contributed by German writers, although there are two from outside sources, one by Mr. J. Steele, Chief Traction Engineer to the Consulting Engineers, Ranald J. Harvey, London, and the other by Mr. R. Dugas, French National Railways. These deal with the development of diesel railway traction in Great Britain and compare the various sources of energy available. American diesel developments, various conclusions to be drawn from experience in Germany, tests made with diesel railcars designed for special service in tropical countries for shunting and light railways, and so on, and many other interesting aspects of this important side of railed traction, find mention in this work. Professor H. Buschmann, Esslingen, is the editor.

Permanent Way Fastenings.—Detailed information regarding railway permanent-way fastenings, for all types of rails, is contained in a brochure published by the Exors. of James Mills Limited, Bredbury Steelworks, Stockport. The application of Mills steel keys, heat-treated steel jaws, and Macbeth spike anchors, are illustrated in this brochure, which also contains diagrams and details of tests carried out *in situ* with different types of rail fastenings. A questionnaire is included to facilitate replies to enquiries.

THE SCRAP HEAP

Guard Crowded Out

The guard of the 8.31 Bromley North-Charing Cross train was crowded out of his van by a rush of passengers at Cannon Street Station and was left behind.—From "The Evening News."

Sirens at Doncaster Works

The wartime air-raid siren at the Doncaster locomotive and carriage shops of British Railways will shortly be heard again in the town. It is to replace the present steam hooter which sounds finishing time and lets the men know when they have to return to work. The hooter has recently been inaudible in some of the shops over the widespread works.—From "The Yorkshire Post."

Bird Nests in Railway Points

A wagtail has built a nest, and laid five eggs, under some points at Upton Station, on the Cudworth-Hull goods traffic line. Some 24 trains a day, pulling about 40 wagons each, run over the nest.

Mr. A. Harvey, stationmaster, said he had never seen anything like it in his 34 years on the railway. The bird seemed to be frightened of human beings, and flew off as they approached the nest, but she sat tight when trains passed over her.—From the "Sheffield Telegraph."

Irritating the Passenger

The "Orient Express" from Paris, with all seats booked, drew out of Milan Station with one compartment almost empty. The sole occupant was

an Indian traveller—and his 300 performing fleas.

The other passengers had fled from the compartment in Milan Station after an ebony box had fallen from the luggage rack, burst open, and liberated the fleas.

The Indian promised the outraged passengers he would have the fleas back in their box by the time the train reached Trieste on its way to Belgrade.—From "The Daily Telegraph."

Railway Centenarian

On Wednesday, July 26, Mr. Robert Broughton, of Kensington, celebrated his hundredth birthday. Mr. Broughton, who is the Railway Benevolent Institution's oldest annuitant, was formerly a goods clerk at Stockton-on-Tees, and retired in 1895 after 31 years' service with the Lancashire & Yorkshire, Great Northern, and North Eastern Railways.

A Deasle Fright

A locomotive recently delivered to the Louisville & Nashville Railroad was described in rather unique terms by a columnist in a Kentucky weekly newspaper. The text runs:

"There's a fright train that runing from Paris, Ky., Maysville an back the same day, a deasle engine. It goes down to Maysville little end in frunt, that is the frunt end, and comes back it is pullen the train backerds, the little end is behind. It runs as fast one way as it does the other. That is all true."—From the "Streamliner" published by the Electro-Motive Division of General Motors.

Central London Railway Golden Jubilee

A correspondent writes: I recall the opening of the Central London Railway from Shepherds Bush to the Bank on July 30, 1900, and travelled on the first train, after securing the first few tickets booked as souvenirs of the popular "Twopenny Tube" as it soon became to be known.

A small crowd awaited the opening of the gates at 5.30 a.m. and the late Mr. Charles Aldington welcomed the first passengers, as Superintendent of the Line.

Wood House Park and grounds situated in Wood Lane, which was a popular pleasure resort, had been acquired by the railway company for the building of the generating station and car depot, and the trains were hauled by electric engines, subsequently withdrawn because of vibra-

tion and damage to property all along the track, and replaced by motor trains.

On the opening day Bond Street Station was not completed, and the sensation of travelling at speed as the train descended the dip at the London end was a matter of comment.

The popular fare was 2d. to any station, and on the first Sunday the new line was open thousands of East End residents made the journey to Shepherds Bush and back.

Tom Tiddler's Ground

An ode to the Bank on Waterloo — Station

There are fairies in the corner of our station,
Though they cannot turn your silver into gold,
Yet they gather in the spoil from all and sundry,
Like the misers in the storybooks of old.

Little care they for the Scripture's admonition
That it's better far to give than to receive;
They consider that, with paper/cash transactions,
It's a safer plant to doubt than to believe.

From the farthest outposts of this mighty station
Comes the boodle, bagged and docketed each day,
From the bookstalls, booking offices, and buffets,
Under strictest supervision all the way.

And the fairies in the corner, bright and perky,
Live like multi-millionaires from ten till three,
As they, Midas-like, absorb this one-way traffic,
But—here's the point which always puzzles me.

What they do with all the cash, I can't imagine,
Though a life-time's thwarted hopes induce a doubt
In the altruistic instincts of these fairies,
For one seldom sees the jolly stuff come out!

My small quota never grows the tiniest bonus,
They even charge me for its board and bed,
But it never pays to remonstrate with fairies—
One may find one's self for ever in the red!

Yes, it's tactless to offend the "little people,"
For we never can be really sure, can we,
That the cheques we sign, anticipating pay-day,
Won't come bouncing back at us, endorsed "R.D."!

A. B.

New L.M.R. Named Train



"The Welsh Dragon" about to leave Rhyl on its inaugural run, mentioned in our July 14 issue

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Heavy Fruit Traffic

During the deciduous fruit season just ended, the South African Railways made special provision for the transport of heavy fruit crops in the Western Province to Cape Town docks and the various consuming centres. During the season (November to May), eleven fruit specials were run daily from producing areas to ports and inland markets, covering some 2,000 miles daily. Before schedules are fixed, a survey of fruit prospects is made by the railways, in collaboration with the Department of Agriculture and other bodies concerned.

Further Electrification

Work is now in hand on the electrification of the main line from Cape Town to Touws River, 160 miles. Special electric locomotives powered by six 500-h.p. motors will operate this mountainous section. These will be the most powerful units in service, the existing units being the "3E" of 2,500 h.p. and the "1E" of 1,200 h.p.

PAKISTAN

New Services

Due mainly to the virtual cessation of through movement east and south-east of Lahore since Partition, the routing of traffic throughout the North Western Railway has changed completely since 1947. As a result one mail and two expresses run through daily each way between Karachi and Peshawar via Lahore. Air-conditioned coaches run and excellent meals are available on the mail trains. A special organisation is being set up to plan and arrange tours by rail. Already, periodical excursion trains are being run from Karachi to Dokri and back, allowing tourists a full day in which to study and enjoy the unique archaeological excavations and treasures of Mohenjo-Daro. These trains accommodate all classes and include a dining car. Appreciations of the arrangements have been received and the results are encouraging.

Indigenous Supply of Fuel Oil

As all coal now has to be imported from distant countries and is so costly, the supply of fuel oil for locomotives—of which 60 per cent. have been converted from coal burning—is vitally important to the North Western Railway. The bulk of the oil still comes by sea from the Persian Gulf to Karachi, but the Attock Oil Company is supplying a considerable tonnage of fuel oil for use on the Rawalpindi and Lahore Divisions. This indigenous source of supply is on the Rawalpindi division.

Proposed Line in Lower Sind

A survey is in hand by the N.W.R. for a new line to serve the area to be

developed by the Lower Sind Barrage, which is being constructed at Kotri.

TASMANIA

Withdrawal of Local Passenger Trains

The Legislative Council has approved a scheme empowering the Transport Commission to run a bus service to replace the non-paying local steam train between Launceston and Deloraine and also the branch rail motor between Deloraine and Mole Creek.

Legislation and Expenditure

The Governor of Tasmania, Sir Hugh Binney, when opening the first session of Parliament, stated that authority would be sought to operate road passenger services in co-ordination with the railways, where desirable, and for additional expenditure on passenger rolling-stock for the main lines.

Included in the provisions of a Public Works Execution Bill read a first time in the House of Assembly are £126,000 for 26 bogie goods wagons, £120,000 for six articulated passenger carriages, £5,500 for the heating of Launceston Workshops, £25,000 for staff housing, £38,000 (additional amount) for amenities building at Launceston.

Refreshments on New Diesel Railcars

A trial service of light refreshments was recently made on the new articulated diesel railcars on the evening service passenger trains between Hobart and Launceston.

The refreshments, for some forty passengers, were served on individual trays fitted with recesses similar to those in use on airplanes. Passengers were unanimously in favour of the service becoming permanent. Such a service, obviating the necessity for a stop en route for refreshments, would reduce the through travelling time by about 12 min.

Government Bus Service Rejected

During the same session the Council rejected the proposal that the Transport Commission should take over the road service between Launceston, Scottsdale, Derby, and Herrick. The section between Lilydale and Scottsdale is served by a rail motor, but its withdrawal has been made contingent on replacement by a satisfactory alternative road service.

BRAZIL

Santos-Jundiá Electrification

On July 20, electric traction was officially inaugurated on the 40-mile section of the Estrada de Ferro Santos a Jundiá between Mocca and Jundiá. The opening ceremony was attended by the Minister of Transport & Public Works and Dr. Renato de Azevedo Feis, Administrator of the Railway.

The work has been carried out by The English Electric Co. Ltd., which is supplying 15 Co-Co mixed-traffic locomotives and three 3-car suburban sets.

GREECE

Rolling Stock from Italy

By the terms of the Italo-Greek peace treaty Italy is bound to pay to Greece a reparation amount of \$(U.S.) 100,000,000. An economic collaboration agreement between Greece and Italy was concluded at Rome on August 31, 1949, whereby Italy undertook to pay the reparation amount in kind within a period of five years, beginning August, 1949.

Reparation deliveries were to total the equivalent of about \$21,000,000 between August, 1949, and June, 1950, while following values have been agreed on for subsequent periods: about \$24,000,000 for the second year, approximately \$25,000,000 for the third year, about \$20,000,000 for the fourth year, and about \$10,000,000 for the fifth year falling in 1954.

Means of transport are to account for a considerable part of the reparation deliveries. Their value will range from \$31,700,000 to \$64,000,000. Railway rolling stock will account for from \$15,000,000 to \$25,000,000. Orders placed by Greece for railway rolling stock during the first ten months of the agreement are:—

16 Fiat diesel cars, total seating capacity 1,152	
8 Fiat trailer cars, total seating capacity 640	
40 passenger coaches, by Uerimm, total seating capacity 3,064	
10 luggage vans, by Uerimm	
6 postal vans, by A.V.I.S.	
5 postal and luggage vans, by A.V.I.S.	
170 covered goods wagons, 40-ton capacity	By Marchetti, A.V.I.S., C.M.S.A.
25 cattle wagons, 40-ton capacity	
25 refrigerator wagons, 40-ton capacity	
The total cost of the above rolling stock amounts to \$6,277,981.	

Greece is to supply to the Italian firms concerned, on request, scrap iron and scrap metals, copper, tin, nickel, pig iron, and special kinds of timber required to carry out the reparation orders. These Greek supplies are to be paid for by Italy at world prices. The operation of this agreement has been entrusted to a semi-official concern established *ad hoc* in Rome (Compagnia Commerciale e Finanziaria).

FRANCE

Long Run with Diesel Locomotive

The "Calais-Mediterranean" Express, comprising nine sleeping cars, a restaurant car, and van, making up a train of 543 tons, was recently hauled from Nice to Paris, 675 miles, by the 4,400-h.p. diesel-electric locomotive 262 DA 1, driven by M. Fraemke, chief *conducteur-electricien* of the S.N.C.F. The previous day the same locomotive hauled the "Blue Train" from Lyons to Nice. The result of this first experimental long run was considered most satisfactory.

The Railways of Korea

Review of the development of the system in fifty years, mainly by the Japanese

KOREA was in the Middle Ages a tributary kingdom of China, but about 1885 Russia obtained considerable influence. This was later weakened, first by the Sino-Japanese war of 1894-95 and then the Russo-Japanese war of 1904-05, when Japan became dominant and in 1909 dethroned the Korean monarch.

Korea is seven times the size of the Netherlands and has 227 persons to the square mile. The total length of the railways was in 1937 some 2,125 miles.

It is difficult to obtain precise details of the present railway situation in Korea and the "Universal Directory of Railways & Railway Officials" for 1949 has to admit that no replies were forthcoming to repeated applications for information. Our Dutch contemporary, *Spoor-en Tramwegen*, for July 13, 1950, includes an article on the history of the Korean railways, from which many of the following details are taken.

Early Concessions

Railways came into the picture in Korea in the late 1890's, when American, Japanese, Russian, and French speculators were in competition to try and gain concessions. A few were granted but only one was followed up, under the supervision of a quasi-independent Korean government. On March 26, 1896, an American named J. R. Morse, of the American Trading Company, of Yokohama, obtained a concession for making a railway 25 miles long from Seoul, the capital, to the coast.

By the time the Americans had about 18 miles ready the Japanese had managed to exercise the real control over affairs and they built the remainder themselves. Early in 1900 the single line from Seoul to Chemulpo was opened to traffic, which was almost exclusively passenger. There was one important bridge about 600 yards long, and American-type rolling stock was used.

The promoters had commercial objects in view and, had they not have parted with their business, would have been satisfied with the results, for 6 to 7 per cent. was paid. The Korean Government granted concessions for two more lines, but it was not so much the original concession holders as the Japanese Government which carried out the work, and any return from it was only to be expected in the distant future. Political and military considerations, however, decided the course of events.

In 1896 a Japanese company, which had taken over and completed the Seoul-Chemulpo line, received a concession for the southern portion (Seoul-Fusan) of a great trunk route from Antung on the Manchurian frontier through Seoul to the south-east point of the peninsula at Fusan. The Korean Government gave the land free

of rental but retained a right to buy the railway in 15 years and stipulated that the work should be done entirely by Korean and Japanese labour. Not until 1901 was a company formed.

Russia, after the Sino-Japanese war, had obtained, also in 1896, a concession from the Chinese for a Chinese Eastern Railway direct through Manchuria to Vladivostok and southwards to Port Arthur and made haste to build it quickly. On November 3, 1901, the last rail was laid on the Trans-Siberian line connecting Moscow with Vladivostok.

The Russians' activity prompted the Japanese Government to take a hand in the matter. The Japanese obtained considerable influence over the Seoul-Fusan company, in guaranteeing 6 per cent. for 15 years on the capital of 25,000,000 yen. Work was begun in 1902 and the line was expected to be ready by 1905. At the outbreak of the Russo-Japanese war about three-quarters of the line were finished and the remainder was quickly carried out under military pressure; in December, 1904, it carried troops.

Japanese Take Over

For the northern portion, the Korean Government gave a concession to a French undertaking in 1896. This company also found difficulty in raising capital and did not begin business until 1902. It built only some 6 miles out of 313 miles, without laying permanent way on the roadbed and then surrendered the concession. The Japanese military authorities took this work in hand immediately after the outbreak of war and by an expenditure of 20,000,000 yen managed to put the line into running condition in the space of a year.

At the same time a connecting line, 188 miles long, was laid between Mukden and Antung in Manchuria. The military authorities were no doubt able to carry out the work in so short a time as the northern part of this co-called "backbone" line did not call for heavy engineering works, but the southern portion was much more difficult to build. It required 24 tunnels, totalling some 7,300 yards, of which one was some 1,220 yards long, and 229 bridges in which there was one of 400 yards and another of 460 yards. After the Russo-Japanese war the whole line was properly laid and completed at the rate of 44 miles per year, and in 1914 this work was completed.

The north-south main line, 590 miles long, has several branches. The southernmost is the important line to Masan (Masampo) a second port in South Korea. This was also later relaid in good condition but is exclusively of military importance. The branch which leaves the main line halfway be-

tween Seoul and Fusan at Taejon and runs to Mokpo and has its own branch to Kunsan is of commercial importance. It is 163 miles long and traverses an important rice growing country.

A Costly Enterprise

North of the capital are a few branches leading to harbours on the west coast. In the south there is another branch to the east from Taegu towards the port of Pohan, a harbour opposite Japan itself and of strategical importance. It was intended to make Taikyou an important junction for a direct cut-off line to Seoul, but this plan has never been realised. This idea belonged to a greater plan which the Japanese had in view before the 1914 war.

By 1914 the 125-mile connection between Seoul and Wonsan (Gensan) on the east coast was finished. It was costly to make because of the great difference in height that had to be overcome, and it is of mainly military importance by reason of the connection it makes through to the north-east near Haeryong, on the Siberian frontier about 110 miles from Vladivostok. This line, over 300 miles long altogether, was completed in 1928, forming a link between the centre of Korea and the mining district in the north-east and its garrison towns.

In the mining territory also there are several narrow gauge lines leading to the nearby harbours. Even before the first world war the Japanese government was planning a cross-connection from Wonsan to Pyongyang, that is, back to the trunk route Antung-Seoul-Fusan. This railway, 138 miles long, was brought into use in 1941.

Although, therefore, the building of railways in Korea was first of all attributable to the Americans and their private enterprise, the initiative soon passed to the Japanese. From 1906 onwards the railways were under the superintendence of the Japanese Resident-General; from 1917 the working was made over to the South Manchuria Railway Company, which was Japanese property, but in 1925 the old situation was re-established and the lines came under the Railway Department of the Korean Government.

The Korean railway system, which lies between Japan and Manchuria has great international significance. In normal times the Japanese Government maintains a steamer service between Shimonoseki and Fusan, with connections to the trains, and it is physically possible to go from Japan through Korea to Manchuria and thence by the Trans-Siberian to Moscow. Even in 1913 there was three times a week a Korean-Manchurian express which, from Fusan to the connection with the

(Continued on page 97)

An Embankment Across Post-Glacial Mudbanks in Denmark

Because of the geological formation, a new embankment had to be constructed when the section was doubled

THE North Jutland main line of the Danish State Railways from Randers to Aalborg crosses a number of post-glacial "fjords" with large unstable layers of mud and peat. One of these shallow valleys is the Lindenberg Aa between Skovring and Stovring Stations. It is crossed by a single-track embankment 400 yd. long and some 25 ft. in height, opened for traffic in 1869. Because of extensive sand filling, this embankment has settled satisfactorily and not entailed unduly large maintenance works.

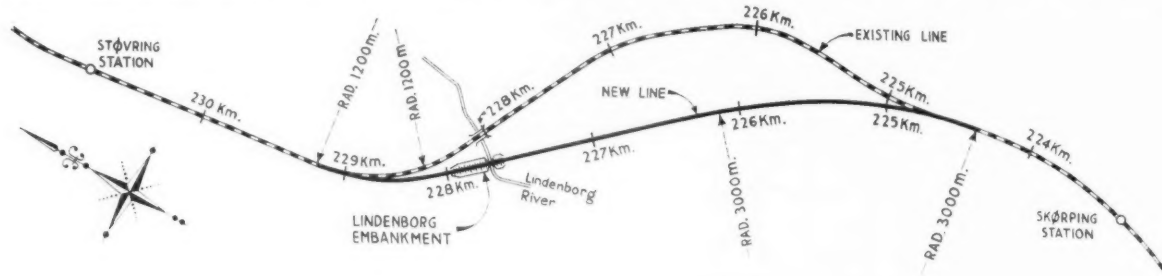
When it was decided a few years ago, to double this section, the engineers were faced with the choice of widening the existing embankment or constructing an entirely new embankment, parallel to the existing one. After extensive test borings and geo-

logical surveys, it was decided to adopt the latter solution and at the same time improve the curvature and shorten the alignment of the new southbound track. The necessary earthworks were carried out in 1941-1943 but, to allow the earth to settle, the embankment has not yet been brought into use. Periodic measurements are being taken to ascertain the extent of the settlements. A report on these works, by Mr. T. C. Broen Christensen, of the Danish State Railways, has appeared in our Danish contemporary, *Ingeniøren*. We are indebted to the author for the illustrations reproduced.

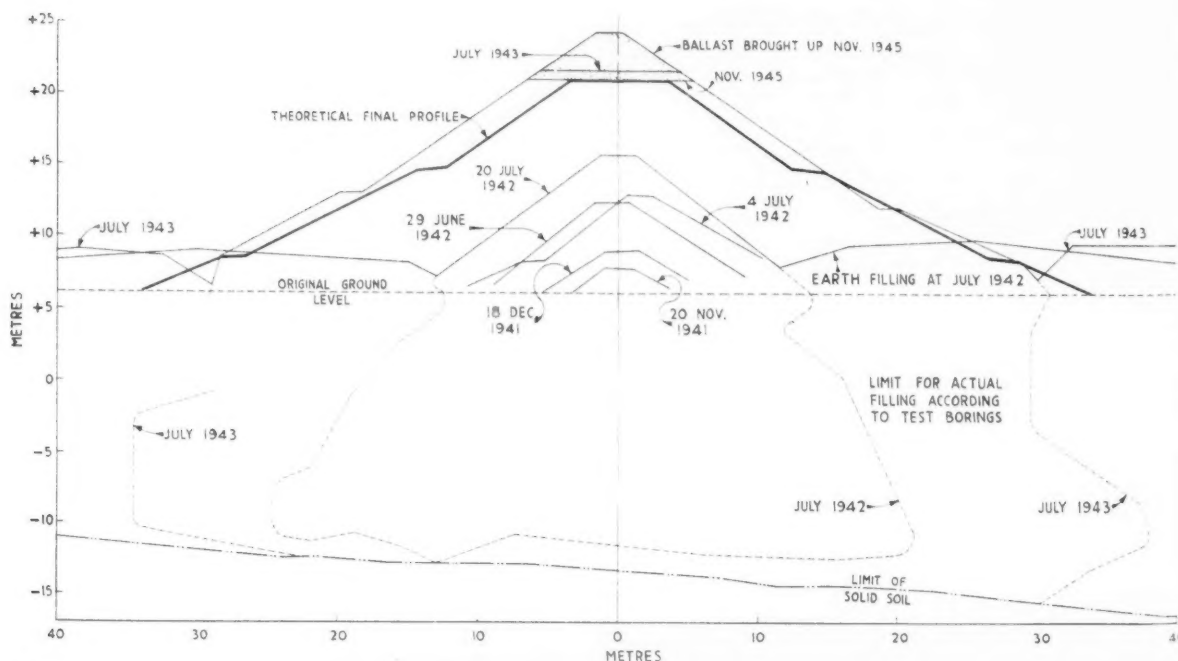
At the point where the new embankment crosses the valley, the depth of the post-glacial deposits varies between 2 and 25 yd. above the comparatively

solid layers of glacial sand which also are not over reliable. The approximate contour lines of the glacial strata were mapped out with the help of the test borings, and a deep "hole" was found to extend to within a few yards of the existing embankment. It was the discovery of this depression which finally caused the engineers to decide on a separate embankment, avoiding the depression on the far side. Another decision based on a study of these contour lines was to divert the course of the river to a point some 60 yd. further south where the relatively solid soil comes closest to the surface, so as to minimise the difficulties of foundations for the new bridge.

The new embankment is some 650 yd. long. Its maximum height above



Section of line between Stovring and Skovring Stations, Danish State Railways, showing existing line, and new line on shorter alignment



Cross-section of new embankment showing progress of filling

ground is 16 yd., and its maximum height above the comparatively solid subsoil 37 yd. Just under one-half of the 350,000 cu. yd. of sand fill needed for the embankment was required for the compression and partial displacement of the sand and peat layers. The earthworks were begun during the summer of 1941, after the river had been diverted to its new bed. The tip material was dumped along the centre line at as steep an angle as possible, so that the heaviest possible weight could be brought to bear within the shortest possible time.

Several instances of sudden subsidence were experienced, including one when a train with 20 fully-laden tip wagons was standing on the new embankment. Generally, however, the settlements proceeded steadily, and the existing embankment was never endangered.

Settlement Accelerated

From 1943 to 1945 the embankment was allowed to settle. In the autumn of 1945 it was decided to accelerate the settlement by superimposing a ballast layer of sand corresponding to four times the maximum train weight to be expected. This brought about a further compression until, at the beginning of 1949, the settlement almost ceased, the maximum subsidence in the vicinity of the "depression" being 4 ft. It is expected that when the sand ballast is removed and the permanent way installed, the new embankment will be as stable as the existing one.

Aerial view of section from Stovring end showing existing line on left and formation for new line in centre



The Railways of Korea

(Concluded from page 95)

Trans-Siberian, a distance of 950 miles, took 33 hr. and between the two world wars this time was noticeably cut.

The gauge is predominantly 4 ft. 8½ in. and the system follows the South Manchuria Railway in general layout and practice. On the standard gauge lines there were in 1937 315 locomotives, 754 coaches and 3,444 wagons and on the narrow gauge (0-76 m.) 31 locomotives, 76 coaches and 319 wagons. For passenger work 4-6-2 locomotives are used, and for

goods 2-8-2. The coaches are American type, though some have arch roofs instead of clerestories. Observation cars are used, with a small guard's compartment at the train end. Sleeping cars follow British practice but are two-berth. The day coaches are the open type. Stations follow Japanese design.

The correspondent in South Korea of a leading London daily newspaper expresses the opinion that the railways in South Korea are not yet working to full wartime capacity. Delays in turn-round at Fusan are overlong, and the speed of trains is now abnormally slow;

one journey of 85 miles took him 14 hr., and one of 55 miles, 6 hr.

American Superfortress aircraft have dropped 500 tons of bombs on Seoul marshalling yards, bringing all movement to a standstill and heavily damaging repair and assembly shops. An ammunition train was blown up in Taejon, the main line junction south of Seoul, since destroyed.

The east coast line is understood to be still incomplete, and the finished northern section is variously reported as ending at Yangyang, near the 38th Parallel, and Samchok, some 70 miles further south.

High Speed in Switzerland

Enterprise of the Swiss Federal Railways and the associated smaller lines shown in the summer timetables

By Cecil J. Allen, M.Inst.T.



Train of lightweight stock, Swiss Federal Railways, with Bo-Bo locomotive of the "Re 4/4" class, 55½ tons in weight

THE 1950 summer timetables reveal a considerable extension in the use of lightweight stock on the main lines of the Swiss Federal Railways, and also in the number of runs booked at high speed in that country, the fastest of which is scheduled at 66 m.p.h. from start to stop. Table I shows that 18 Swiss runs are now booked at over 60 m.p.h., all of them over the well-aligned and fairly level stretch between Lausanne and Geneva. No fewer than seven trains, in both directions of run-

ning, now cover the 37.4 miles between the two cities in 34 min. start to stop, with two others in 35 min., three in 36 min., two in 37 min., one in 39 min., and one in 40 min. The 4.34 a.m. takes only 41 min., with three intermediate stops, and is responsible for the Nyon-Morges run at 69 m.p.h. that heads the table.

One of the most notable bookings in Table I is that of lightweight train No. 3, 12.38 p.m. from Geneva to Zurich, which is allowed only 65 min. to cover the 60.4 miles from Lausanne to Berne, for the first stage of this run is a 10-mile climb at an average of 1 in 55 from Lausanne to Corbérone, and later there is a 16-mile stretch of single track from Romont to Fribourg. The same train also makes the fastest run of the day from Berne to Zurich, 80.7 miles in 89 min., at 54.4 m.p.h. inclusive of a number of speed restrictions; but this time is beaten by train No. 14 in the opposite direction (1.19 p.m. from Zurich), which makes the same run in 88 min. (55.0 m.p.h.), continuing with 67 min. Berne to Lausanne (54.1 m.p.h.), and 34 min. thence to Geneva (66.0 m.p.h.).

Fastest Daily Service

The two trains last mentioned offer the fastest daily service between Geneva and Zurich; No. 13 covers the 178.5 miles in 3 hr. 13 min. eastbound, with Lausanne and Berne stops included, and No. 14 in 3 hr. 14 min. westbound. Considering the nature of the terrain traversed, this is a fine achievement. There are now seven daily lightweight services in each direction between

Geneva and Zurich, five via Berne and two via Neuchâtel, with an average journey time, including all stops, of 3 hr. 39 min., which works out at almost exactly 50 m.p.h. The Geneva-Zurich and Geneva-Basle trains via Neuchâtel are responsible for the fast runs in Table I between Lausanne, Yverdon, and Neuchâtel.

There has been a development of the recently-instituted fast services which permit travellers from the principal Swiss cities to have a long day in Milan, North Italy, and to return the same night. The previous 6.25 a.m. Lötschberg fast railcar service from Berne, which is non-stop over the 46 miles from Spiez to Brigue (including the climb to the Lötschberg tunnel) in the notable time of 64 min., is now a complete train with restaurant car, and has a connection from Geneva at 5.43 a.m. and Lausanne at 6.31 a.m., also with restaurant car and through coaches for Milan. The combined train reaches Milan at 11.5 a.m., and returns at 7.15 p.m., reaching Berne at 11.40 p.m., Lausanne at 11.56 p.m., and Geneva at 12.40 a.m. A similar lightweight service now runs over the Gotthard route, leaving Zurich at 6.5 a.m. and reaching Milan at 10.50 a.m.; it returns from Milan at 6.55 p.m. and reaches Zurich at 11.56 p.m. Connections are made with Lucerne and the trains run through to and from Winterthur in each direction.

Sleeping Car Express

Reference to the Gotthard line is a reminder that for the past two years a regular non-stop run of 105.4 miles in length has been scheduled in each direction between Lucerne and Bellinzona. The train concerned, which is a heavy sleeping car express leaving Lucerne at 8.11 a.m. southbound and Bellinzona at 7.32 p.m. northbound, is allowed 146 min. each way, which requires an average speed of 43.4 m.p.h. This schedule includes lifting the train through 2,352 ft. difference of level between Flüelen and the northern entrance to the Gotthard Tunnel, and no less than 3,028 ft. on the northbound run in climbing from Bellinzona to the southern portal.

Some striking accelerations have been effected on one or two of the rack-and-pinion mountain lines by the introduction of new lightweight motor-coaches on certain of the services. On the Wengernalp Railway, for example, four ascents are made daily from Lauterbrunnen to Kleine Scheidegg in 43-46 min. instead of the usual 68-72 min., and similarly from Grindelwald in 36-37 min. instead of the normal 57-58 min.

From Zermatt up to Gornergrat, also, there are journeys of lightweight

TABLE I
FASTEST TRAINS IN SWITZERLAND
Electrically operated throughout

Between	Distance	Time	Speed	Trains daily
	miles	min.	m.p.h.	No.
Nyon—Morges ...	16.1	14	69.0	2*
Geneva—Lausanne ...	37.4	34	66.0	7*
Morges—Nyon ...	16.1	15	64.4	1
Geneva—Lausanne ...	37.4	35	64.2	2*
Lausanne—Geneva ...	37.4	36	62.3	3
Geneva—Nyon ...	13.5	13	62.3	1
Geneva—Lausanne ...	37.4	37	60.6	2
Yverdon—Lausanne ...	24.8	25	59.5	1
Lausanne—Morges ...	7.8	8	58.5	1
Geneva—Nyon ...	13.5	14	57.9	1
Geneva—Lausanne ...	37.4	39	57.5	1
Lausanne—Yverdon ...	24.8	26	57.2	2
Lausanne—Geneva ...	37.4	40	56.1	1
Lausanne—Berne ...	60.4	65	55.8	1
Neuchâtel—Lausanne ...	47.2	51	55.5	1
Berne—Olten ...	41.4	45	55.5	1
Geneva—Morges ...	29.6	32	55.5	1
Berne—Fribourg ...	19.4	21	55.4	1
Lausanne—Yverdon ...	24.8	27	55.1	2*
Lausanne—Geneva ...	37.4	41	54.7	1
Zurich—Berne ...	80.7	88	55.0	1
Zurich—Aarau ...	31.1	34	54.9	1
Berne—Zurich ...	80.7	89	54.4	1
Berne—Lausanne ...	60.4	67	54.1	1
Brigue—Sion ...	33.5	37	54.0	1
Olten—Burgdorf ...	27.9	31	54.0	2
Geneva—Nyon ...	13.5	15	54.0	3*

* In both directions of running

units up and down in 43-44 min. in place of the normal 70 min. The motorcoaches concerned were introduced on both railways in the summer of 1948.

Reverting to the lightweight trains of the Swiss Federal Railways, Table 2 sets out the details of two 1949 runs between Lausanne and Geneva behind the very competent Bo-Bo lightweight electric locomotives of the "Re 4/4" 401 class, which were timed by Mr. Henry Butler. These are restricted nominally to ten bogie 70-ft. cars on the principal high speed services, but with the 12.35 p.m. from Lausanne (Train No. 10) the load was made up to twelve, with a total weight amounting to 360 tons.

The customary smart start was made down the falling gradient to Renens, after which speed rose to all but 80 m.p.h. by Morges; and after a slight drop on the short rising grades to St. Prex and Rolle, there was some extremely fast travelling until speed was reduced for the curves at Versoix. For 13.4 miles, from Rolle to Tannay, speed averaged 77.5 m.p.h., and rose to a maximum of 82 m.p.h. at Crans, and an average of 74 m.p.h. was kept up for the entire 33.3 miles from Renens to Pregny. For a locomotive of no more than 55½ tons weight hauling a train of this magnitude the completion of the 37.4 miles from Lausanne to Geneva in 32 min. 46 sec. was a noteworthy achievement; at that time the train concerned was allowed 38 min. for the run, but the actual time made cut 1½ min. even below the fastest 34-min. schedule.

TABLE 2
SWISS FEDERAL RAILWAYS—LAUSANNE-GENEVA

411 12 330 360			Bo-Bo Locomotive No. Load, coaches " tons tare " tons gross			416 8 220 245		
Distance	Time	Speeds*				Distance	Times	Speeds*
miles	min. sec.	m.p.h.				miles	min. sec.	m.p.h.
0-0	0 00	—	LAUSANNE	...	...	37.4	38 35	30.4
2.8	3 51	43.6	RENENS	...	...	34.6	33 03	72.6
5.2	5 49	73.2	Denges	...	...	32.2	31 04	75.5
7.8	7 47	79.3	MORGES†	...	...	29.6	29 00	76.5
10.5	10 03	71.5	St. Prex	...	...	26.9	26 53	79.7
13.4	12 31	75.6	Allaman	...	...	24.0	24 42	49.7
15.2	14 00	72.8	Perroy	...	...	22.2	22 32	34.5
16.6	15 10	72.0	ROLLE	...	...	20.8	20 06	80.0
18.5	16 38	77.7	Gilly	...	...	18.9	18 40	75.6
21.0	18 34	77.6	Gland	...	...	16.4	16 41	72.5
23.9	20 53	75.6	NYON	...	...	13.5	14 17	45.6
26.0	22 29	81.6	Crans	...	...	11.4	11 47	46.8
27.0	23 14	80.0	Céligny	...	...	10.4	10 30	57.9
29.2	24 56	77.7	COPPET	...	...	8.2	8 38	64.0
30.0	25 33	77.3	Tannay	...	...	7.4	7 53	67.7
32.3	27 33	69.0	Versoix†	...	...	5.1	5 51	65.8
34.0	29 04	67.2	Genthod	...	...	3.4	4 18	68.6
35.2	30 05	70.8	Chambésy	...	...	2.2	3 15	66.1
36.1	30 53	67.5	Pregny	...	...	1.3	2 26	32.1
37.4	32 46	41.4	GENEVA	...	...	0.0	0 00	—

* Average speeds station to station

† Slight speed reduction

‡ Severe speed reduction

On the eastbound journey locomotive No. 416 of the same type, with a lighter train, was hampered by checks, two for permanent way repairs, one—most unusually—for signals at Rolle owing to a freight train having failed to clear in time into a siding ahead, and a series of signal checks approaching Lausanne.

The speed recoveries from each slow-down were commendably rapid,

especially that from Crans, which produced an acceleration from 25 to 72 m.p.h. in 4 miles, and to 80 m.p.h. in 9 miles.

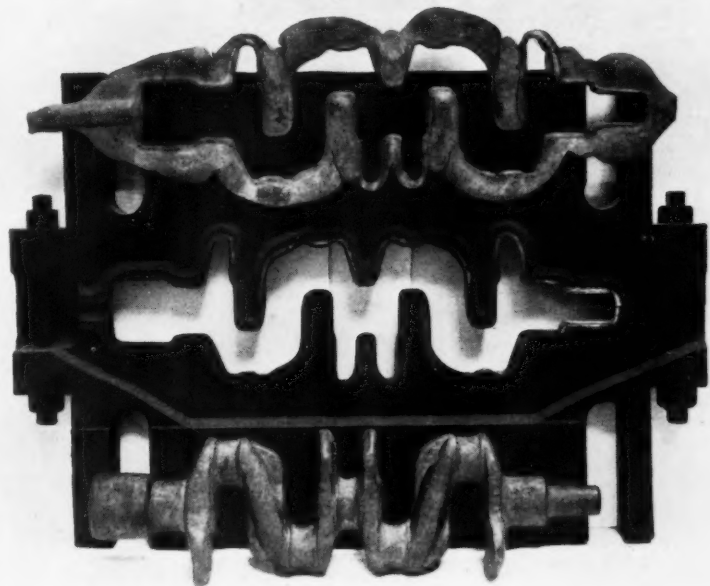
This was on a 34-min. booking, but with such a succession of delays timekeeping was impossible; with all four slacks included, however, and three of them very severe, the journey of 37.4 miles was completed in 38 min. 35 sec.

Facing Drop Stamp Trimming Dies

A RECENT development made with a view to increasing the life of drop stamp trimming dies is to arc weld the profile edges. The die edges are first ground to a 45 deg. chamfer, after which Stellite grade 6, manufactured by Delora Stellite Limited, Shirley, Birmingham, is arc welded to form a bead which is finished off by means of a small portable grinder. The profile is ground to follow the existing profile, the top edge being left with a 5 deg. rake angle.

In use, the effect, when compared with the normal design of stripping die, is that the rake angle forms a cutting edge. It is claimed that the action is such that oversize forgings produced as a result of wear in the drop stamp dies can be stripped without undue strain.

It is further claimed that a trimming die treated with this new development has trimmed over 9,000 forgings without any serious deterioration of the cutting edges. Normalising is recommended after three deposits to avoid using an unnecessary quantity of material to bring the edges back to normal.



Trimming die and crankshaft

Completion of Flood-Damage Repairs, East Coast Main Line

The last bridge rebuilt as a permanent structure on the Dunbar-Berwick section



Free Kirk Bridge, No. 133, between Grantshouse and Reston, immediately after the flood

THE serious flooding and washaway destruction that occurred on August 12, 1948, on the London-Edinburgh East Coast main line between Berwick and Dunbar was reported at the time in our issue of August 20, 1948, which included a map of the area affected. Subsequent issues of August 27, September 17, October 1, and October 29, 1948, described the reconstruction programme and the diversion of traffic.

Since then, the work of permanent reconstruction has been in hand, until on May 21, 1950, it was finally completed by the erection of the 71-ft. 6-in. steel girders and concrete decking at Bridge 130 enabling the down track to be laid over it. The following is a brief description of these permanent reconstruction works and the preliminary measures taken to facilitate them.

It may be remembered that on the five-mile section between Grantshouse and Reston seven bridges carrying the railway over the River Eye were totally destroyed, and as a temporary measure steel bridges of a military type were built to replace them and to restore traffic as quickly as possible. They were erected in such a way that after the re-opening of the line to traffic it would be possible to build concrete abutments and wing-walls as substructures for the permanent bridges without causing interference with traffic. This work progressed steadily according to schedule, and on February 19 this year work began on the placing of the new superstructures in position.

Six of these permanent superstructures are of the deck type, with one pair

of steel girders under each line of railway, and the seventh is of the through type with a small depth of construction to give sufficient clearance between the river bed and the underside of the superstructure.

On each of the Sundays between February 19 and May 21 inclusive, with the exception of March 5 and April 9—or on twelve working Sundays in all—the half of each of the six deck-type superstructures, carrying either the up or down line, was replaced as described below. The same procedure in the erection was followed each Sunday.

Method of Erection

First, two locomotive cranes removed the girders and the top portions of the steel trestling forming the half of the temporary bridge carrying the up line. The two new steel girders to carry this track—which are of all-welded construction, and with diaphragms fixed in position weighed in all 26 tons—were next brought forward and placed in position. Special dish precast rein-



A locomotive crane placing well-deck units of the concrete decking on the steel main girders for the up track

forced concrete units in 3-ft. width were (as seen in one of our illustrations) then set on top of the new girders to form a well-deck floor on which were laid the stone ballast and permanent way to carry the up line. On the following Sunday the other half of the temporary bridge was removed and the permanent superstructure erected to carry the down line, the transfer from temporary to permanent superstructures occupying two consecutive Sundays in the case of each bridge. The three illustrations, on this page show three stages in the reconstruction of one of these deck bridges, No. 133, namely, the temporary military-type steel trestle and girder structure, the temporary superstructure after construction of the permanent abutments beneath it, and the bridge as finally completed.

Meanwhile the seventh bridge, already referred to as of the through type, was replaced, the work entailing occupation of the line being carried out on the other two Sundays of this period. On March 5, in the first phase, the three main girders, also of welded construction, were placed by railway cranes on a prepared staging to one side of the temporary bridge and the steel joists to form the floor were set in place. On weekdays thereafter the steel joists were riveted to the main girders, and then encased in concrete to form the floor, which was waterproofed by covering with bituminous sheeting.

On Sunday, April 9, in the second phase, the line was completely cut—both up and down tracks being removed by a steam crane—and the new span complete with deck or floor and weighing about 350 tons, was slewed with the aid of hand winches into position over temporary runways of steel balls running between old rails. After being rolled into position the span had to be lowered about 4 in. on to its bearings. This was accomplished by the use of sand-jacks—a simple arrangement of piston and cylinder—by which movements to very fine limits are obtained by the controlled release of sand from an opening in the base of the cylinder.

Rebuilding Ayton Culvert

In addition to these bridges the rehabilitation of the railway included the reconstruction of a culvert near Ayton where the flood waters had been impounded to a depth of some 26 ft. against the railway embankment. At this place the clay in the embankment had been under water pressure for some weeks before the water level could be lowered and the stream diverted through a temporary culvert, and as it was necessary to reconstruct the culvert close to its original position, the hazards of tunnelling through clay in an unstable condition, due to the absorption of water, had to be reduced by the application of electro-osmosis to dry out the material. In this work the Department of Scientific & Industrial Research gave much valuable assistance. The new culvert, 200 ft. long, was constructed with precast reinforced con-

(Continued on page 107)



Free Kirk Bridge temporarily rebuilt as a viaduct consisting of military-type steel trestles and girders



Temporary structure still in place after the concrete abutments and wings of the permanent bridge had been built



The bridge reconstructed as a permanent concrete and steel deck structure carrying normal traffic

Mixed-Traffic Locomotives for Egypt

Eighteen 4-6-0 locomotives transported fully erected by road to Glasgow Docks for shipment to Alexandria

RECENTLY the Egyptian State Railways have taken delivery of eighteen 4-6-0 locomotives with double bogie tenders from the North British Locomotive Co. Ltd., Glasgow. These locomotives are similar to the 32 supplied in 1949, and described and illustrated in our issue of June 24, 1949, except for a number of slight modifications. The tenders have been completely redesigned and are fitted with two four-wheel bogies. The locomotives were transported by road wagon in the fully erected condition from Hydepark Works to Glasgow Docks for shipment to Alexandria.

The engines and tenders have been built to the designs and requirements of the Egyptian State Railways and are equipped as previously with apparatus for burning heavy oil fuel. Modifications to the locomotives include the raising of the boiler working pressure to 225 lb. per sq. in., and lagging the boiler, firebox, and cylinders with lightweight Limpet brand asbestos mattresses. The two Gresham &

Craven R.C.W. injectors are fitted on the right-hand side of the engine and the main steam stand has been placed outside the driver's cab and equipped with standard valves, including two steam whistles. Sandboxes with Lambert wet sanding apparatus are provided to sand at front of leading coupled wheels only.

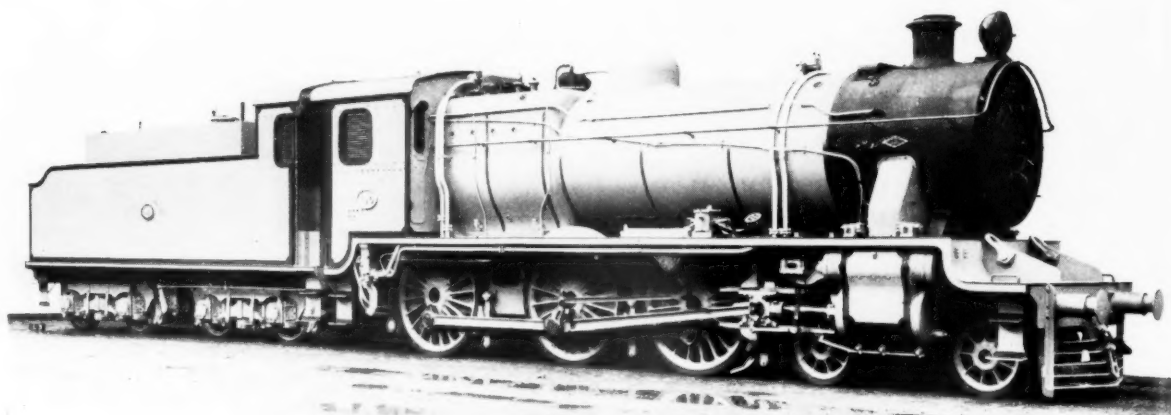
The carrying wheels of the engine and tender are fitted with Timken roller bearings, and six engines are equipped with Timken Cannon type roller bearing axleboxes at the coupled wheels. The tender, which is of the double bogie type, has a capacity of 5,500 gall. of water, and 10 tons of oil are carried in the fuel tank. The water and oil-fuel tanks are of all-welded construction, and the underframe, which is built up of steel sections and plates, is also welded.

The bogies are designed with compensated beams and are built with plate frames 1½ in. thick and cross-stretchers of steel plates and sections. End ties of steel plate are securely riveted to

the frames. Laminated bearing springs are provided, and the vacuum brake equipment actuates blocks on the outside of all tender wheels. A hand brake is also fitted.

The principal dimensions of the locomotives are as follow:—

Cylinders, dia. and stroke	21 in. x 28 in.
Wheels, coupled, dia.	6 ft. 0 in.
" bogie, dia.	3 ft. 0½ in.
" tender, dia.	3 ft. 6 in.
Wheelbase, coupled	16 ft. 0 in.
" engine	29 ft. 3 in.
" engine and tender	61 ft. 6 in.
Height, rail level to boiler centre	9 ft. 6 in.
" top of chimney	14 ft. 7 in.
Heating surfaces:—	
Tubes	1,958 sq. ft.
Firebox, including syphon	233 sq. ft.
Total evaporative	2,191 sq. ft.
Superheater	456 sq. ft.
Total	2,647 sq. ft.
Grate area	31.25 sq. ft.
Boiler pressure	225 lb. per sq. in.
Weight of engine in working order	85 tons 17 cwt.
" tender in working order	68 tons 16 cwt.
engine and tender in working order	154 tons 13 cwt.
Adhesive weight	63 tons 1 cwt.
Adhesive factor at 75 per cent. boiler pressure	4.88
Tractive effort at 75 per cent. boiler pressure	28,940 lb.
" 85 per cent. boiler pressure	32,800 lb.



Egyptian State Railways locomotive for mixed-traffic operating

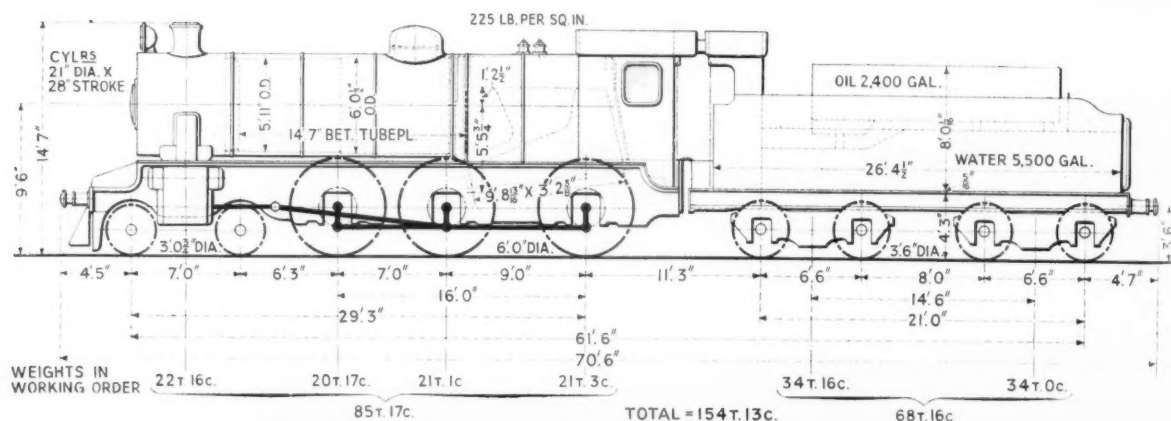


Diagram showing principal weights and dimensions of the locomotive

RAILWAY NEWS SECTION

PERSONAL

BRITISH RAILWAYS APPOINTMENTS

The Railway Executive has announced the following appointments:—

Mr. C. A. Humphries, Chief Welfare Officer in the Staff & Establishment Department, Western Region, to be Welfare Officer, Staff & Establishment Department, Railway Executive headquarters.

Mr. D. R. Fraser, Senior Investigator, Accountant's Department, London Midland Region, to be Assistant (Budget, etc., matters), Railway Executive headquarters.

At a meeting at the House of Commons on July 20, it was decided to reconstitute the Parliamentary Channel Tunnel Com-

missioner Technical College and Leeds University, and, after supervisory experience at Doncaster (Carr) Running Shed, he was appointed Depot Superintendent Bidston, Birkenhead. In 1924 Mr. Johnson took up an appointment on the Nigerian Railway and remained with that system until 1943, when he became Chief Mechanical Engineer of the Gold Coast Railway. During his Colonial service Mr. Johnson has seen many changes in West Africa, and was responsible for initiating and organising the first spare-time training school for African footplate staff in 1933. He acted as General Manager & Harbour Authority, Gold Coast Railways, on several occasions, and was responsible for recent railway development proposals.

Mr. W. H. Maass, M.I.Mech.E., M.I.Loco.E., Advisory Engineer, South African Railways, Office of the High Commissioner for South Africa, London, who, as recorded in our June 23 issue, is returning to duty in South Africa, was born at Lydenburg, Transvaal. After matriculating he joined the South African Railways as an apprentice fitter in the Pretoria workshops in 1924. He pursued technical studies at the Pretoria Technical College, and in 1929 was selected for appointment as a pupil mechanical engineer. In 1931 he was transferred to gain overseas experience by serving on the staff of the Advisory Engineer, London, and in 1934 returned to South Africa and assisted in establishing the South African Railways



Mr. H. A. Johnson

Chief Mechanical Engineer, Gold Coast Railway, 1943-50, who is taking up an appointment with British Timken Limited



Mr. G. J. A. Lindenberg

Appointed Advisory Engineer to the High Commissioner for the Union of South Africa, London



Mr. W. H. Maass

Advisory Engineer, South African Railways, High Commissioner's Office, London, who is returning to South Africa

mittee and to invite Mr. Christopher Shawcross, K.C., who was Chairman of the Committee in the last Parliament, to form a panel of experts to give technical advice. The following officers were elected: Chairman, Mr. Ernest Thurtle; Vice-Chairmen, Lord Amulree, Mr. H. Hynd, and Mr. Teeling; Honorary Treasurer, Mr. E. L. Mallalieu; Honorary Secretary, Lt.-Commander Christopher Powell.

Mr. B. B. Varma, General Manager, East Indian Railway, is now in the United Kingdom and will subsequently be proceeding to Rome for the International Railway Congress.

Mr. H. A. Johnson, M.I.Mech.E., M.I.Loco.E., A.M.Inst.T., who, as recorded in our June 16 issue, has retired from the position of Chief Mechanical Engineer, Gold Coast Railway, has subsequently taken up an appointment with British Timken Limited. He joined the Great Northern Railway as a premium apprentice under Sir (then Mr.) Nigel Gresley and began his training at Doncaster works. Mr. Johnson volunteered for military service in the 1914-18 war, and was wounded while serving in France. He subsequently completed his engineering training and technical education at Don-

Mr. G. J. A. Lindenberg, B.A., B.Sc. (Eng.), M.I.(S.A.)E., A.M.I.Loco.E., until recently Chief Technical Manager, South African Railways, Johannesburg, who, as recorded in our June 23 issue, has been appointed Advisory Engineer to the High Commissioner for the Union of South Africa, London, graduated as B.A. at Rhodes University, and at the Witwatersrand University obtained the degree of B.Sc. (Eng.). He has held the positions of Airways Manager Mechanical Engineer; Chief Superintendent (Motive Power); Assistant Chief Mechanical Engineer; and Chief Stores Superintendent. During the time he was Assistant Chief Mechanical Engineer, Mr. Lindenberg was released for active service. He was Assistant Director (Mechanical) on the staff of the Deputy Director of Supplies & Transport. He has been a member of the Conciliation Board and of the Superannuation Fund Committee, and has served on the Accidents Investigation, Staff Training, and Sick Fund Committees. Mr. Lindenberg was appointed Chief Technical Manager in 1948.

Mr. D. G. Denoon, F.I.A.M.A., Joint Publicity Manager, British Insulated Callender's Cables Limited, has been elected Chairman of the British Electrical & Allied Manufacturers' Association Publicity Committee.

inspection organisation at the then newly-established Iscor Steelworks. In the next year he was appointed to the Salt River workshops as Assistant Engineer (Mechanical), and in April, 1937, renewed his association with the Advisory Engineer's Office, London, in the capacity of Acting Assistant Advisory Engineer, in which position he was confirmed in September of that year; from the beginning of 1941 to November, 1945, he was Acting Advisory Engineer. During the war years he served as the High Commissioner's technical representative on the Commonwealth Supply Council (Railway Equipment) set up by the Ministry of Production for the purpose of screening priorities and to advise on production of locomotives and other rolling stock. In 1946 Mr. Maass returned to South Africa as Mechanical Engineer, East London. He was appointed Advisory Engineer, South African Railways, Office of the High Commissioner for South Africa, London, in January, 1949.

Mr. H. G. N. Read has been appointed a Director of the Trent Motor Traction Co. Ltd., in place of Mr. C. G. G. Dandridge, who has resigned.

Mr. T. N. H. Ward has joined Sentinel (Shrewsbury) Limited as North-Western Sales Representative.



Mr. A. S. Buswell

District Passenger Superintendent, Newcastle, North Eastern Region, 1938-50, who has retired

Mr. A. S. Buswell, District Passenger Superintendent, Newcastle, British Railways, North Eastern Region, who, as recorded in our July 14 issue, has retired, joined the Great Central Railway in 1900. After passing the company's higher grade examination he was given experience in all the principal departments. Mr. Buswell was appointed Chief of the Fares & Rates department in the office of the Superintendent of the Line in 1916, and was the passenger representative of the G.C.R. at the Railway Clearing House from 1916 to 1919; he was elected Chairman of the R.C.H. Passenger Rates & Fares Conference in 1919. Mr. Buswell in 1920 was appointed Assistant District Traffic Manager (Operating), Southern Division, G.C.R., and on the formation of the L.N.E.R. was made Assistant District Superintendent, Marylebone. He became Assistant District Superintendent, Manchester, in 1927, District Passenger Manager, York, in 1936, and he was appointed District Passenger Superintendent, Newcastle, in 1938.

British Railways, Western Region, has announced the appointment of Mr. C. H. D. Read, Motive Power Superintendent, Colwick, Eastern Region, as District Motive Power Superintendent, Newport. Mr. C. R. L. Price, District Motive Power Superintendent, Willesden (London) Depot, London Midland Region, has been appointed District Motive Power Superintendent, Old Oak Common (London) Depot, Western Region.

The Eastern Region of British Railways has announced that Mr. A. S. Edwards, Goods Agent, Poplar Dock, has been appointed Parcels Agent at Liverpool Street.

Mr. P. A. Foley, who, as recorded in our issue of February 15, 1946, retired in December, 1945, from the position of District Traffic Superintendent, Dublin, Great Northern Railway (Ireland), has been appointed Lecturer in Transport in the School of Commerce, Trinity College, Dublin. After his retirement, Mr. Foley served on the Transport Advisory Committee in the Irish Ministry of Industry & Commerce.

Mr. Arthur E. Aldridge, Chief Clerk, L.M.S.R. Savings Bank, Euston, who, as recorded in our July 14 issue, has been appointed Secretary of the L.M.S.R. Savings Bank, began his career in the L.N.W.R. Audit Office, Euston, in 1909 and was transferred to the Savings Bank in 1911. When the L.M.S.R. Savings Bank was instituted in 1924, he was mainly responsible for the amalgamation of the Scottish railways savings banks into the L.M.S.R. Bank; he was appointed Chief Clerk in 1937. Mr. Aldridge has been Secretary of the Railway Savings Bank Secretaries Committee since 1948, and is a Fellow of the Corporation of Secretaries. He served with the Hertfordshire Yeomanry during the 1914-18 war and was awarded the French Croix de Guerre for gallantry in action at Gaza in 1917. During the 1939-45 war Mr. Aldridge commanded a company of Hertfordshire Home Guards, with the rank of Major.

Mr. C. W. Wells, Assistant General Freight Traffic Manager, Canadian National Railways, whose death, at the age of 61, we recorded briefly last week, was born at Bosham, Sussex, England. He entered the service of the Grand Trunk Railway, Canada, as a junior clerk in the traffic department at Montreal in 1905 and was appointed chief clerk, Tariff Bureau, in 1918, and became chief of section in that department in 1923. The following year, he became Assistant Manager of the Rate & Tariff Bureau and, two years later, was made Chief of that department. Mr. Wells was appointed Assistant General Freight Agent in 1930 and General Freight Agent in 1939; he moved to Toronto in 1940 and became Freight Traffic Manager, Central Region, in 1945. He returned to Montreal in 1946 to assume the position of Assistant General Freight Traffic Manager.

Mr. J. A. Argo, Freight Traffic Manager, Central Region, Toronto, Canadian National Railways, has been appointed Assistant General Freight Traffic Manager, with headquarters at Montreal. Mr. G. E. Smith, General Freight Agent, Toronto, has been appointed Freight Traffic Manager, Central Region, Toronto.

Mr. K. A. Scott Moncrieff has resigned from the board of Madras Electric Tramways (1904) Limited.

INSTITUTE OF TRANSPORT

The undernamed have been elected to fill the vacancies for Ordinary Members of the Council of the Institute of Transport which will arise at September 30, 1950:—Members: Messrs. Raymond William Birch, Chairman, Potteries Motor Traction Co. Ltd. (former Member of Council); George Cardwell, Chairman, Road Passenger Executive; Frederick Leonard Castle, General Manager, Siemens & General Electric Railway Signal Co. Ltd.; William Joseph Everard, Director, F. T. Everard & Sons Limited; Archibald Henderson, Member, Road Haulage Executive (former Member of Council); Cyril Hamilton Minett, Manager, Legal and Claims Department, British India Steam Navigation Co. Ltd. (Gray-Dawes & Company); Stanley Ernest Parkhouse, Chief Officer (Operating), Railway Executive; John Reginald Pike, Chief Rates & Charges Officer, Railway Executive; George Harry Searle, Director of Transport, Ministry of Food; Associate Member: Mr. Sidney Berald Taylor, Deputy Secretary, British Transport Commission.



Mr. V. F. Hare

Appointed Assistant (Statistical Matters), Chief Financial Officer's Department, Railway Executive Headquarters

Mr. V. F. Hare, Head of Section (Statistics), Accountant's Office, London Midland Region, who, as recorded in our June 30 issue, has been appointed Assistant (Statistical Matters), Chief Financial Officer's Department, Railway Executive headquarters, entered the service of the L.N.W.R. in 1914, in the Chief Goods Manager's Department at Euston. In 1915, he joined the Forces and served overseas with the Railway Construction Units, R.E., until 1919, when he returned to his former duties. Mr. Hare was subsequently transferred to the General Manager's Statistical Department and in 1922, at the time of the amalgamation of the L.N.W.R. and Lancashire & Yorkshire companies, he was transferred to Manchester, to assist in the co-ordination of railway statistics. He returned to London, with the Statistical Department, in 1924, and in 1930 he was transferred, with the Statistics Section, to the Chief Accountant's Department, L.M.S.R. In 1942 Mr. Hare was loaned for three years to the Ministry of Fuel and Power and served under Sir Harold Hartley. In addition to his duties with the London Midland Region, Mr. Hare was, in 1948, appointed Secretary to the present Railway Executive Statistical Committee, and assumed responsibility for the collation of British Railways Statistics.

Mr. P. Holt, Statistical Assistant to the Chief Financial Officer, Railway Executive, who has retired, joined the service of the Lancashire & Yorkshire Railway in 1899. Following twelve years' experience in the Traffic Department and after studying railway subjects at Manchester University, he was attached to the staff section in the office of the Chief Traffic Manager. He was a member of the Lancashire & Yorkshire Railway General Manager's Statistical Office from its formation in 1912 until its reorganisation under the L.M.S.R. in 1927. When with the headquarters statistical section of the L.M.S.R. in 1930, Mr. Holt was transferred to the Chief Accountant's Department. He was appointed Secretary of the R.E.C. Statistical Committee in 1938, and held that position until 1948, when he was appointed Statistical Assistant to Chief Financial Officer, Railway Executive headquarters.

Ministry of Transport Accident Report

*Penmanshiel Tunnel, British Railways,
Scottish Region: June 23, 1949*

Colonel R. J. Walker, Inspecting Officer of Railways, Ministry of Transport, inquired into the fire which broke out at 8.40 p.m. on June 23, 1949, in the tenth coach of the 7.30 p.m. express, Edinburgh to Kings Cross, as it reached Penmanshiel Tunnel, between Cockburnspath and Grantshouse, resulting in that coach and the one ahead being completely gutted. Seven passengers were injured, two seriously. There were 15 passengers and a guard riding in the coach where the fire began, and the flames spread with such rapidity and vigour that they enveloped the whole of it in a few seconds.

A strong brake application was made immediately from the guard's compartment and the train stopped within 30 seconds; the first eight coaches and part of the ninth being in the tunnel. Most of the passengers in the tenth vehicle reached the guard's compartment and others went forward through the train. Three were trapped in a compartment and forced to break a window and jump out while the train was moving. One of them, a woman, was gravely injured and another lady, in a compartment further back, suffered badly from fumes, smoke, and burns, and was in hospital for a considerable time. The injured were attended to immediately by a doctor travelling on the train and by two others who arrived later, and were taken to hospital in buses and cars. Two fire brigades arrived and the fire was finally subdued by 10.30 p.m. It was a fine dry, warm evening with a gentle following wind.

By the time the train stopped, the whole of the tenth coach was burning fiercely and the fire spreading forward to the ninth, which soon after was blazing also. It was seen that there was no hope of saving either coach. The leading end of the eleventh vehicle, a buffet car, began to burn, but being protected by the guard's compartment of the tenth, which burned less readily than the rest, the flames could be held in check by extinguishers. By well co-ordinated efforts the crew quickly managed to part the train, at the front of the ninth coach and rear of the tenth, and the front portion was taken forward at once, reaching Grantshouse at 8.50 p.m., only ten minutes after the train stopped. The last two vehicles were hand worked clear of the blazing coaches and safely isolated.

Evidence

Colonel Walker heard evidence from no fewer than 35 witnesses, of whom 20 were passengers in the train, which would occupy considerable space to set out, even closely summarised.

The signalman at Innerwick, some 5½ miles in rear of the tunnel, noticed nothing amiss with the train, neither did the signalman at Cockburnspath, which it passed at 8.31 p.m. As it was an unusually long time in section his colleague at Grantshouse telephoned at 8.46 p.m. to ask at what time it had cleared the track circuit at the intermediate block home signal, 1,073 yards in rear of the tunnel; at 9.0 p.m. he telephoned again to say the front portion had arrived and to inform him of the fire.

A carriage and wagon examiner and train lighting examiner testified that everything was in order including the electrical

equipment, before the train left Edinburgh. As regards the remainder of the evidence tendered to him, Colonel Walker remarked that although the circumstances in such a case make it difficult for witnesses to remember precisely what action has taken place, and it is difficult to judge time in seconds, even in calm moments, a close study of the statements he received and certain material facts enabled him to say that there had been no exaggeration and that the whole fitted together in a remarkable way. "These statements," he said, "confirmed by experiments which have been since made, revealed that the fire spread with a rapidity and fierceness which it is difficult to conceive." Three passengers were trapped in a compartment within 15 to 20 seconds of the first breaking out 15 ft. away, and the whole incident, from the outbreak of fire to the train stopping, occupied less than 75 seconds and possibly even less than a minute.

The Burned Coaches

The burned coaches were a corridor third and corridor brake composite, built under contract in 1947 for the former L.N.E.R.

The bodywork was of steel sheet panelling exterior with hardwood framing; roofs and floors were of deal, door pillars of teak, and partitions between compartments and corridor partitions of Gaboon faced block plywood. Bogies and underframes were all steel. The roofs were covered with canvas and painted with a white lead paint and the floors with linoleum, except in the lavatory compartments, where "Corkoid" was laid. Paints used in decoration were of the usual oil bound varieties, except for the corridor panelling, sprayed with a clear cellulose lacquer. Upholstery was moquette covering, with sponge rubber and hair cushioning. Electrical equipment was of the normal 24 volt type. Full load on each coach, with all lights on, was about 25 amps.

The coaches were burned completely down to frame level and gave no indication of what caused the fire or why it spread so quickly. The only point of interest was that the heat had been sufficiently intense to melt the plate glass windows. Until the evidence of a driver, travelling as a passenger, came to light two months later, suspicion was cast on the design and standard of workmanship of the electrical equipment as a possible cause of the fire, and the region of the fuse box in the main corridor as the probable point of origin. This witness, however, saw the fire burst out at the bottom of a wall of the transverse corridor of the tenth coach. There were no wires near this point, so that electrical equipment was not the cause.

A thorough examination of, and series of experiments with, similar coaches gave the following results.

Tests on Paint

Various tests had already been made with the paints used but with negative results. Attention was now focused on the corridor. The walls, of Gaboon faced block plywood, had been sprayed in the first instance with three coats of a clear cellulose lacquer which had subsequently been covered, when the vehicle went in for some minor repair, with a synthetic varnish. This finish extended down to floor level,

where there was no form of skirting board to protect it.

A light was set to a small twist of paper lying on the floor of the coach, such as might come from a cigarette packet, and it was placed against the wall. In a few seconds the surface of the wall was on fire, and in less than 10 sec. the whole transverse corridor was filled with flames. The fire had to be put out before it was too late. It was then seen that a 2 ft. width of the wall surface had burnt vertically upwards from floor to roof. The experiment was repeated on the opposite wall of the corridor, when a lighted match was thrown into the corner. After a pause of 10 sec. the surface of the wall suddenly burst into strong flames about 2 ft. in length; the root of the flames climbed up the first 2 feet of the wall in 15 secs., by which time the flames themselves extended to the roof, and reached the top of the wall in the next 10 sec. The entire corridor was now in flames and the fire had to be extinguished immediately. A further attempt was then made to ignite the surface with a lighted cigarette end, without success, but Colonel Walker was not convinced that under more favourable conditions of draught and position, a cigarette would not have been sufficient, and thought it probable that a cigar end or the smouldering dottle of a pipe would have started the fire without much difficulty.

These tests, repeated at a later date with the same results, indicated without any doubt that the paint on the corridor wall was the principal agent in the fire. Further tests on the paint were then made by the Scientific Research Department of the Railway Executive, who reported that the material which burned so freely was the clear cellulose lacquer, and that its rate of burning was proportional to the amount of cellulose nitrate in the dry film. Its analysis was: nitrocellulose, 16.8 per cent.; resin, 2.7 per cent.; plasticiser, 5.3 per cent.; solvents, 75.2 per cent. The synthetic varnish with which the cellulose lacquer had afterwards been covered had, if anything, a delaying effect on the rate of burning, but was not otherwise concerned with it.

Rapid Flame Spread

A panel from a similar coach was then sent to the Joint Fire Research Organisation of the Department of Scientific and Industrial Research and Fire Offices Committee, who applied to it the "Surface Spread of Flame Test" as specified in British Standard Definitions No. 476-1932 (Amendment No. 2, 1945).

This is an accurate and scientific measure of the liability of a material to ignite and of the rate at which it will burn, and it serves to classify materials into one of the following prescribed groups:

Class 1.—Surfaces of very low flame spread. Those surfaces on which not more than 6 in. mean spread occurs.

Class 2.—Surfaces of low flame spread. Those surfaces on which, during the first 1½ min. of test, the mean spread of flame is not more than 15 in. and the final spread does not exceed 18 in.

Class 3.—Surfaces of medium flame spread. Those surfaces on which, during the first 1½ min. of test, the mean spread of flame is not more than 15 in. and during the first 10 min. is not more than 33 in.

Class 4.—Surfaces of rapid flame spread. Those surfaces on which, during the first 1½ min. of test, the mean spread of flame is more than 15 in. or during the first 10 min. is more than 33 in.

The distances of flame spread are measured horizontally.

The Director of the Joint Fire Research Organisation stated that the test panel had a mean spread of flame of 15 in. in 23 sec., 30 in. in 1½ min., and 33 in. in 2 min. 1 sec.

For comparison, the worst material in Class 4 previously considered in this way had a mean spread of flame of 15 in. in 1½ min. and of 33 in. in about 4 min. The inflammability of the surface of the material used in the coach in the train was thus, by a very large margin, the worst in the records of the Joint Fire Research Organisation.

Electrical Equipment

Colonel Walker draws attention to the original doubts concerning the electrical equipment.

The standard of workmanship of the wiring of the coaches was, in his opinion, unsatisfactory. Although the wiring diagram supplied to the contractors specified "wires run in wooden duct up corridor partition," this was not done. From the floor level up to the fuse box, which was in the main corridor and close to the roof, the main leads from the battery and dynamo circuit were run in long and loose loops behind the seats of a compartment; no cleats were used to fasten the wires, which were simply held by pieces of canvas roughly tacked here and there to the compartment partition. They were thus able to move freely with the movement of the train. On reaching the level of the fuse box, they were taken through holes in the hardboard ceiling of the corridor, pulled tightly down, and connected to the box. These holes were roughly cut, and their edges were jagged and sharp, so that the vibration of the coach continually rubbed and chafed the insulation. Evidence that this was happening, was apparent in the coaches inspected. The holes were not provided with bushes to guard against this, nor were they even chamfered. Conditions were therefore favourable for a breakdown of insulation or a complete short circuit. In addition to this Colonel Walker does not consider that the main leads between the dynamo and battery circuit underneath the floor and the fuse box in the corridor roof were adequately protected by fuses. Although the total load in the coach, with all lights on, was less than 25 amps, the only fuses in the system up to the fuse box were in the dynamo and battery circuit itself; these were rated at 100 amps., and blew, on test, at 235 amps. This circumstance, with the indifferent standard of wiring, might have set up conditions which would generate a fire.

Inspecting Officer's Conclusions

The fire originated at the foot of the leading wall of the leading transverse corridor of the tenth vehicle, and, spreading quickly forward, set fire to the ninth. The substance which caused the rapid spread of flame was the clear cellulose lacquer. This rate of spread was, no doubt, accelerated by draughts of air through the corridors. The asphyxiating fumes, which gave rise to alarm in both coaches, were nitrous gases, to be expected when cellulose burns; they are well known to be particularly noxious, and indeed dangerous, when breathed in any concentration. The cause of the fire cannot be determined with cer-

tainty. It was probably a lighted match thrown carelessly against the wall, the dottle of a pipe, or perhaps even a cigar or cigarette end.

The possibilities of electrical failure, or of a cinder from the train engine or from a passing engine, have been carefully considered but there seems no likelihood of one of these having been the cause.

Remarks and Recommendations

Serious fires on passenger trains have occurred rarely in the history of the railways of Great Britain; there have been only two causing loss of life or serious personal injury during the past 20 years. Experience of what can happen in a train fire is therefore limited, and the possible behaviour or consequences of such an event may not be as widely understood as they should be, nor are they easy to imagine. For this reason, in the general design of coaches, the whole question of fire may not always have been given the consideration that its importance warrants. In this particular case, it is evident that it was given no consideration at all, for the inflammable nature of clear cellulose lacquer is no new discovery. It is interesting to note how easily alarm can spread, and how dangerous it can be of itself; in this, it was greater in the coach, where there were only smoke and fumes, than in the other, where the real danger lay.

Particular attention has been focused on this case because certain features have given rise to deep concern. These are:—the ease with which the fire was started, the suddenness of the outburst, the immediate intensity of the flames, the asphyxiating nature of the gases produced, and above all, the extreme and dangerous rapidity with which the flames spread.

Although injury, damage and loss were heavy enough as it was, it must be recorded that it was only a most fortunate combination of circumstances which prevented a more serious result. The fact that the fire broke out in the coach in which the guard was sitting and where the vacuum handle was available, coupled with the fact that the initial outbreak was seen by an experienced engine driver, who took immediate action in skilfully operating the guard's brake valve and bringing the train to a stand, undoubtedly avoided graver consequences. If the fire had occurred elsewhere, there would have been a greater delay in stopping the train, and the burning coach would either have stopped in the tunnel or have been drawn through it. With the flames spreading as rapidly as they did, the possible result of these eventualities needs no elaboration.

Immediate action was taken to withdraw from service those coaches which were known to have been sprayed with the dangerous material, and to review all other existing coaches. It is satisfactory to know, therefore, that the main cause of the fire has now been traced without any doubt and that it has already been eliminated.

The two questions which remain to be considered are how such a dangerous material as clear cellulose lacquer came to be used in the first place, and what steps should be taken to prevent the unwitting adoption of a similar material in the future.

The coaches concerned were built for the London & North Eastern Railway under contract in 1947. In their specification to the contractors, the company detailed by their components the various paints to be used; these paints were all of the ordinary oil-bound kinds, whose inflammable properties were reasonably safe and well-known. A sample panel was also given to the contractors, with the require-

ment that it should be copied both as to colour and as to finish. At some stage, a deviation from the contract to allow for the use of clear cellulose lacquer must have been requested or permitted by the company. Colonel Walker could find no trace of why or when this was done, but it is apparent that no thought was given at the time to the possible inflammability of the new material. Attention must be drawn to the fact that the lacquer was a proprietary brand which could be purchased without difficulty by the general public, and might therefore be expected to be in the same category as the more usual household paints.

A railway coach, whatever its construction, is a medium in which fire is encouraged if once it starts, and this particular fire is a pointed example of what can happen if great care is not taken by test and experiment before any new material is adopted. A scientific classification of the inflammability of materials already exists in the Standard Definitions No. 476-1932 (Amendment No. 2, 1945), to which reference has already been made. It is recommended for the consideration of the Railway Executive the advisability of stipulating, in accordance with these definitions, the lowest permissible classification of all materials which may be used in passenger carrying coaches, and of ensuring that no new material is adopted until it has been tested and until it is known that it falls within the prescribed category.

The selection of the class which may safely be used depends on a variety of circumstances and is a highly technical matter; it would not be practicable to specify, and it need not necessarily be, the least inflammable, Class 1, for each and every material. For these reasons it is further recommended that, in prescribing the different classes, advantage be taken of the specialised experience and knowledge of the Joint Fire Research Organisation of the Department of Scientific & Industrial Research and Fire Offices Committee, who should be consulted.

"All Steel" Coaches

A fire of this nature naturally raises the question of the general construction of railway coaches and whether the so called "all steel" coach is not to be preferred. From the point of view of fire prevention, there is little difference between the two. The coaches in the fire were of composite steel and wood construction; bogies, underframes, and exterior panelling were steel, but body framework, roof pillars, roofs and other members were of wood. In the new standard design for British Railways, the coaches will be of "all steel" construction. Bogies, underframes and exterior panelling will be of steel as before, but body framework, roof pillars, roofs, and other members will also be of steel. The interior furnishings in both cases consisting of compartment and corridor partitions and interior panelling, are still of wood; in addition, in the "all steel" coach, wooden members have to be secured along the steel pillars in order to attach the wooden partition and panels. Upholstery material is the same in both steel and composite steel and wood coaches. It will be seen therefore that it is not intended to build a strictly "all steel" coach, because, for the sake of passenger comfort and general amenity, wooden interior partitions and panelling continue to be regarded as most suitable. To this extent, a fire is no more impossible in a steel coach than in one of composite construction. It is not considered that this calls for criticism provided reasonable precautions are taken.

Colonel Walker does not wish to over-emphasise the risk of fire from electrical cables, but while there is any risk at all, every reasonable step should be taken to minimise it.

Attention should be given to ensure a more satisfactory standard of workmanship in the wiring of coaches, and to the desirability of inserting, as close as possible to the battery and dynamo circuits, an additional fuse whose rating is more commensurate with the load. Where the total load is 25 amps., a fuse of, for example, 40 amps. would provide added protection, and should prove little more expensive in first cost or maintenance than the present arrangements.

It is appropriate to draw attention to the work of the train crew and the other members of the railways travelling on the train. Although the greater part of the train stopped in the tunnel, and in the confusion, not unminged with alarm, it was difficult to find out what was happening in the rear of the train, the railwaymen quickly appreciated the situation and took immediate action as a team. Without any parley the driver set back twice, allowing the train to be parted on either side of the burning coaches; the guard and others were ready waiting to uncouple; and the leading portion of the train was then drawn forward without delay to the next station. At the same time, suitable steps were taken to protect the up and down lines, and the injured and other passengers on the permanent way were moved to safety.

The proof of the efficiency with which the train crew worked is reflected in the fact that all this was done so quickly that the first portion of the train reached Grantshouse Station within 12 min. of the fire breaking out. This is an effort deserving of commendation and reflects credit on the railway service.

Completion of Flood-Damage Repairs, East Coast Main Line

(Concluded from page 101)

crete segments, similar to those used in building the London tube railway tunnels, and is being lined internally with reinforced concrete placed *in situ* to give a finished internal dia. of 9 ft.

Another item in the 1948 flood damage was a slip which occurred in the embankment at milepost 53½, near Burnmouth. At this point the main line runs close to the sea, but about 200 ft. above the foreshore. As a temporary measure, the line was at first moved some 8 ft. to the landward side to permit the passage of trains at reduced speed. Boring operations here proved the presence of rock at reasonable depth below the railway formation, and mass concrete retaining walls and a bridge have now been constructed as a permanent repair. Some 400 yds. of new retaining wall built on the landward side has allowed the tracks to be re-aligned here for normal high-speed running.

The speed restrictions which have operated since October, 1948, over the seven bridges and between Burnmouth and Berwick-on-Tweed were lifted when the summer timetable came into operation, and, later, when full speed is also permissible over the embankment at Ayton culvert a chapter of events unprecedented in the history of railways in Britain will be brought to a close.

Staff & Labour Matters

R.C.A. Wage Claim

In submitting its claim to the Railway Executive for an all-round pay increase of 7½ per cent. for salaried staffs the R.C.A. stated that a later communication would be sent in regard to railway workshop supervisors. The Railway Workshop Supervisory Staffs Joint Negotiating Committee now announces that it is to claim for a 7½ per cent. increase in all workshop supervisors' salaries.

The Railway Executive already has before it an application submitted some time ago that staff coming within the Railway Workshop Supervisors' Agreement shall be given a minimum classification which will provide a differential of not less than £50 a year above the earnings of the highest paid man supervised. It is contended in support of the application, that the earnings of pieceworkers (excluding overtime and Sunday duty) often exceed those of the supervisory staff under whom they work.

Discussions have taken place at the Railway Workshop Supervisory Staff National Council, and the matter is still under consideration.

Stores Staff Award

The Chairman of the Industrial Court has published his award, No. 2267, on the claim of the employees' side of the Railway Shopmen's National Council that a lieu rate should be paid to stores-issuing staff in the stores department at the following places and to stores issuers and storemen employed in road motor engineering depots: Gorton (E.R.); Bow, Bromsgrove, and Stonebridge Park (L.M.R.); Gateshead, Heaton, Hull, and West Hartlepool (N.E.R.); St. Rollox General Stores (Scottish Region); Newhaven Marine Shops and Southampton (Southern Region); and Cardiff Loco. Carriage & Wagon (W.R.).

In 1947, after discussions at the Railway Shopmen's National Council, it was agreed that where stores issuing staff (timeworkers) were working in conjunction with pieceworkers at the large piecework centres, i.e., main works, they should be paid a lieu rate of 33½ per cent. of their base rate with effect from June 30, 1947. A list of main works at which these arrangements would operate was submitted by the railways. The claim before the Industrial Court was that these arrangements should be extended to the stores issuing staff employed at the centres named above, and also that stores staff at Road motor depots should be paid on the same basis.

The employees' representatives submitted that there were no grounds for differentiation between stores-issuing staff who, whether at main works or other establishments, were working with pieceworkers and whose speed and efficiency govern production to such a large degree. Reference was made to the difficulties and the dissatisfaction which has been created by confining the payment of the lieu rate to stores-issuing staff at certain places, and excluding others where the stores issuer must work at a speed comparable to that of pieceworkers to enable them to earn an average piecework balance, but himself reaps no benefit from the increased tempo.

For the employers it was contended that the lieu rate arrangements agreed at the R.S.N.C. in 1947 had been fully implemented, and all main works (except Gorton) engaged on the construction of locomotives, carriages, and wagons, were included. It was such works which the

railways had in mind when the offer was made in 1947 to pay a lieu rate to stores-issuing staff. They were large piecework centres, and it was an essential part of the agreement that the lieu rate arrangements should only apply at large piecework centres. The agreement reached in 1947 was in settlement of a claim submitted by the union and it was not appropriate for the union to press now for an extension of the arrangement to places which did not come within the category specified in the agreement.

The Court, after considering the evidence and submission of the parties, and having regard to the terms of the agreement reached in 1947, awarded that the claim had not been established.

Engineers' Pay Dispute

The Minister of Labour invited representatives of the C.S.E.U. and the Engineering & Allied Employers' Federation to meet officers of the ministry today. This is his first step under the Arbitration Act since the confederation's report of the existence of the dispute a week ago.

Parliamentary Notes

Transport Employees' Compensation

Mr. Alfred Barnes (Minister of Transport) in the House of Commons on July 19 moved that the Draft Controlled Bodies (Compensation to Employees) Regulations, 1950, be approved. He said these Regulations applied to the staffs of controlled companies owned by the former railway and canal companies before they were transferred to the B.T.C. To claim compensation, a man must have suffered loss of employment or emolument, or worsening of conditions as a result of the transfer of the company. The qualifying period was the same as in the Road Haulage Regulations, namely, eight years' service; war service was to count.

Mr. Geoffrey Wilson (Truro—C.) said that before 1945 it was the principle that every employee of an undertaking acquired compulsorily was safeguarded, and as a rule there was no qualifying period. The major point at which the new regulations differed from the earlier ones was on the doctrine of customary practice; that was to say, the maximum compensation was only awarded to a man who could prove that in the employment which he was occupying at the time of nationalisation there was an established custom that he got compensation in respect of expectation of permanency of employment if his job proved to be redundant. That doctrine very much limited the compensation payable to some men; it depended entirely on the kind of employment they were previously occupying.

Mr. Wilson also criticised the wording of a paragraph which seemed to mean that if a man refused alternative employment within Great Britain he could be debarred from compensation. He hoped that would be moderately interpreted, because today it was not reasonable to ask a man to transfer great distances, in view of the difficulty in finding a house. Compensation should not be denied to a man merely because he was asked to do a thing rather hard to accept.

Mr. R. M. Bell (Buckinghamshire, South—C.) said that working partners were not covered by the new regulations. If people turned their undertaking into a limited company, and became directors, they were treated as employees and got compensation for loss of employment; but a partner was not an officer or servant except for,

perhaps, the taking over of the undertaking's assets.

Mr. Barnes did not feel it desirable to approach the regulations from the angle that many people were concerned through loss of employment or pension rights. Most of these controlled companies were running along just as they were before, and there were not likely to be immediate circumstances to disrupt the normal continuity of employment.

Regarding working partners, Mr. Barnes said that the controlled companies such as Pickford's and Cook's were long established, and did not represent the same changing circumstances that some smaller road haulage companies could pass through which would change the character of an owner or part-owner.

The regulations were agreed to.

Questions in Parliament

Welsh Transport Users' Consultative Committee

Mr. Emrys Roberts (Merioneth—L.) on July 17 asked the Minister of Transport how many times the Transport Users' Consultative Committee for Wales had met during the past twelve months; what recommendations they made; and what action was taken on their recommendations.

Mr. Alfred Barnes, in a written answer, stated: The Transport Users' Consultative

Committee for Wales has met three times during the past twelve months. I am not informed of the recommendations of the Committee; in accordance with the Transport Act, 1947, they are sent to the Central Transport Consultative Committee for Great Britain and to the British Transport Commission.

Locomotive Contracts

Mr. John Grimston (St. Albans—C.) on July 18 asked the President of the Board of Trade if he would make a statement on the reasons why British locomotive manufacturers were unable recently to secure certain contracts in South Africa in competition with German manufacturers.

Mr. A. G. Bottomley (Secretary for Overseas Trade) stated in a written answer: I assume Mr. Grimston is referring to an order for 100 light steam locomotives which was recently awarded to Krupps by the South African Railway Tender Board. I understand that the Krupps tender was considerably lower than the lowest United Kingdom tender.

London Transport Users' Consultative Committee

Mr. J. K. Vaughan-Morgan (Reigate—C.) on July 24 asked the Minister of Transport when was the Transport Users' Consultative Committee for the London area established; what was the area affected, when were the members appointed, and for what periods; what were their qualifications; and what steps had been taken

to draw the attention of the transport-using public of the area to the existence of this committee as a possible medium for the redress of their grievances, if any.

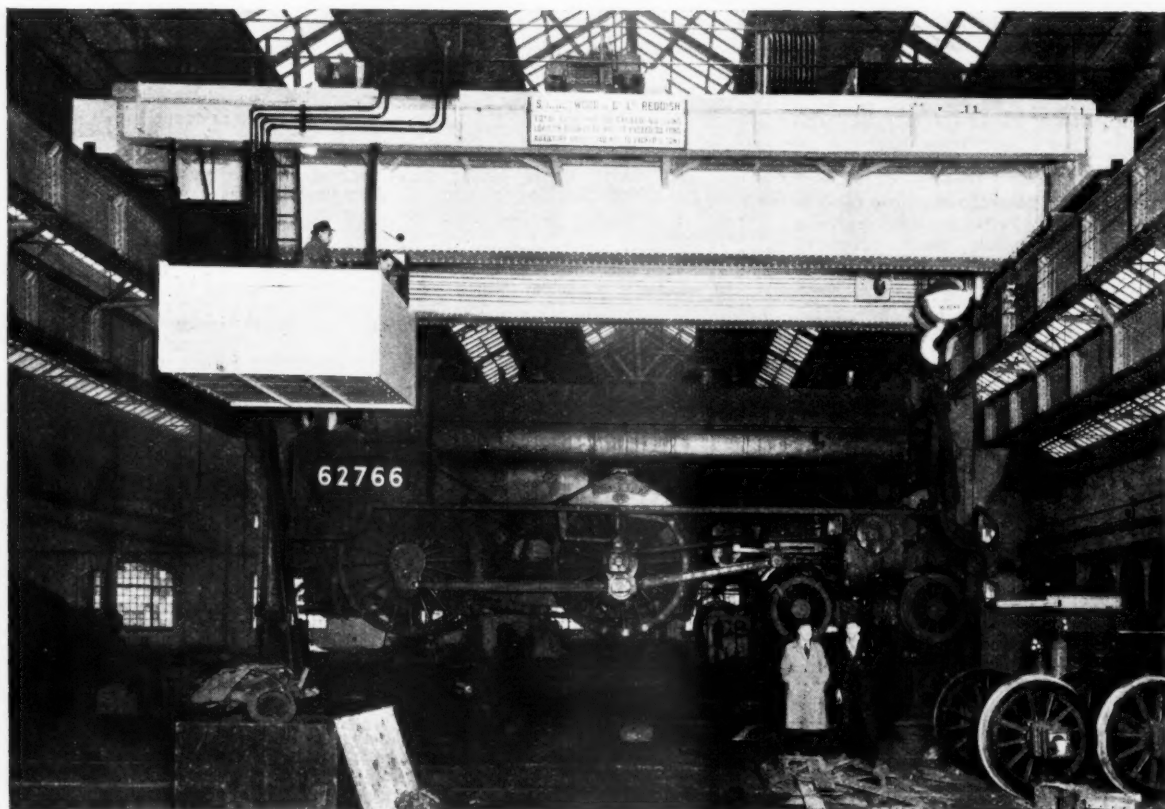
Mr. Alfred Barnes, in a written answer, stated: The Transport Users' Consultative Committee for the London Area, which represents the area covered by the London Transport Executive, was appointed on February 22, 1950. The members were appointed for a period of three years. A list of members indicating the interests they represent was circulated, and press notices were issued drawing attention to the appointment of the Committee.

Water Supply to Railway Executive Cottages

Mr. G. R. Mitchison (Kettering—Lab.) on July 20 asked the Minister of Health whether he was aware that the station house and four railway cottages at Geddington, Northamptonshire, were only supplied with drinking water in cans brought from Kettering; that he had since January, 1950, been in correspondence with the Railway Executive and local authorities; and whether he would ensure that one or other of those authorities should carry out the obligations imposed by the Water Act, 1945.

Mr. Aneurin Bevan (Minister of Health) in a written answer stated: I understand that improving the supply presents difficulties which are still being investigated, and that the cost of connecting the properties to the main would be about £2,000.

Sixty-Ton Locomotive Crane at Gateshead Works



Heywood 60-ton crane at Gateshead Locomotive Works, N.E. Region, with improved controls to permit synchronised hoisting and traversing. Added speed in handling lighter loads is afforded by the six-ton hoists on each crab

Finnish State Railways Traffic Through U.S.S.R. Territory

Security measures by the Russian authorities in the operation of passenger trains through Porkala enclave



Taekter Station, on the border of the Russian-held Porkala territory

As a result of the 50-year lease by the Finnish to the U.S.S.R. Government of the naval base of Porkala with surrounding territory, 18 miles of the Helsinki-Turku main line of the Finnish State Railways lie in Russian territory. On departure from Helsinki, the windows on one side only of westbound trains are covered with iron shutters. On arrival at Köklaks, 15 miles from Helsinki, the Finnish is changed for a U.S.S.R. engine, and

is replaced by a Finnish locomotive, which usually consists of a 4-6-0 locomotive with spark arrester, for the rest of the journey to Turku.

On one occasion, a coach caught fire while the train was passing through the enclave and, as the train did not stop, the passengers had to extinguish the fire as best they could. Trains now carry extinguishers.

Voluminous Russian regulations for

the windows on the other side of the train are shuttered over.

The train crosses the Russian border to Bobäeck. Here Russian guards board the train, two travelling in each vestibule, access to which being forbidden to passengers during the journey through the enclave, which takes 1 hr. 10 min. for the 18 miles. It is impossible, or virtually so, to see out of the train, but some travellers report glimpses of a countryside with every house burnt to the ground. On arrival at Taekter the Russian guards detrain and the shutters are removed.

The Russian locomotive

passengers forbid the taking through the Porkala territory of many articles, including live (presumably carrier) pigeons, and a number of other "articles which may be harmful to the Soviet Union, such as prints, pictures, films, manuscripts and drawings . . ."

Photography at frontier stations and en route through Russian territory is forbidden. The photographs reproduced on this page were taken at great risk of imprisonment to the photographer.

BRAINS TRUST FOR OVERSEAS STUDENTS.—

Some 80 overseas students who are spending their vacations in engineering and other works in the London area attended a brains trust at the Federation of British Industries on July 21. These students, who are drawn from many countries, including the United States, France, Norway, Sweden, Holland, and Finland, are visiting this country under the authority of the International Association for the Exchange of Students for Technical Experience. Mr. Donald McCullough, Public Relations Adviser, F.B.I., was the question master, which included Sir F. Ewart Smith, Technical Director, I.C.I., and Mr. Bertram White, Technical Director, F.B.I. This meeting was the first of a series to be held in London.



Train for Turku at Helsinki, showing shutters over windows on one side of train



Shutters being placed in position at Köklaks, for the journey through Russian territory

Notes and News

District Traffic Superintendent Required.

—The Peruvian Corporation has a vacancy for a district traffic superintendent. A knowledge of Spanish is essential. See Official Notices on page 111.

L.M.R. August Bank Holiday Arrangements.

—With 877 extra main-line trains arranged for the bank holiday period from August 3 to 9, the London Midland Region considers that all travellers should have a comfortable journey. This is a record post-war programme with 130 more trains than last year. The principal places served by the extra trains will be Scotland, North Wales, the Lake District, Blackpool, Liverpool, Birmingham, Sheffield, and Leeds.

British Railways and U.T.A. Combined Rail and Steamer Cruise.

—The first combined British Railways and Ulster Transport Authority cruise of the season, on July 19, included special U.T.A. trains from Belfast York Road to Larne Harbour and back, with a trip in British Railways s.s. *Princess Margaret* from Larne along the Antrim coast and round Rathlin Island. The *Princess Margaret* is on the Larne-Stranraer mail service, and the cruise was fitted in between the regular morning and evening sailings.

J. Stone & Co. Ltd.—Mr. K. H. Preston, Chairman & Managing Director of J. Stone & Co. Ltd., stated at the annual general meeting that his firm were the largest suppliers in this country of air-conditioning equipment for railway coaches, and a contract had just been obtained worth nearly £500,000 for air-conditioning the new luxury trains of the Queensland Government Railways. The accounts showed a profit for the year at December 31 last, after deducting £445,000 for taxation, of £336,486, compared with £254,283 in the previous year. The sum of £100,000 had been placed to contingency reserve in view of the considerable delay experienced in collecting moneys owing by the Argentine Government Railways. A payment was recommended of a final divi-

dend of $7\frac{1}{2}$ per cent. on the ordinary "A" stock, which with the interim dividend of 5 per cent. already paid, made a total of $12\frac{1}{2}$ per cent. for the year. The consolidated profit, after deducting £517,629 for taxation, amounted to £423,303.

Vickers Limited Dividend.—At a meeting of the directors of Vickers Limited on July 20, dividends were declared in respect of the year 1950 at the rate of $2\frac{1}{2}$ per cent. actual, less income tax, on the preferred 5 per cent. stock, $2\frac{1}{2}$ per cent. actual, less income tax, on the 5 per cent. preference stock, and £2 2s. 6d. net per £100 stock on the cumulative preference stock. The payment of these dividends will be made on August 18.

Railway Students Convention.—The convention of the Railway Students Association, London School of Economics & Political Science, is to be held at the Lenton Firs Hall of Residence, Derby Road, Nottingham, from August 24 to 28. The convention programme will include papers on appropriate subjects, a motor coach tour of the Dukeries, and a visit to British Railways (London Midland Region) mechanised marshalling yard at Toton.

New Paddle Steamer for Loch Lomond.

—The Railway Executive has placed an order with A. & J. Inglis Limited, Glasgow, for a new paddle steamer for the Loch Lomond service. The vessel is designed to carry 1,000 passengers and will have a speed of 14 knots. There will be considerably more shelter accommodation than on the present vessels and seating in the dining saloon (81) and aft lounge (60) will be more than twice that provided in existing vessels. The tea lounge will accommodate 38 and there will be a bar on the promenade deck.

United Kingdom Oil Supplies.—The Regent Oil Co. Ltd., 117, Park Street, London, W.1, announces that agreement has been reached between its American parent company, the California Texas Oil Co. Ltd., which supplies 50 per cent. of its

requirements, and H.M. Government, whereby arrangements have been concluded for the supply of oil to the United Kingdom and other sterling markets on a permanent basis. The operation of the plan involves the conversion of a large proportion of Caltex dollar costs to a sterling basis, and payment of income and other taxes in the U.K., as well as transferring a large part of its general operations from New York to London.

Gateshead Tramway Conversion.—By virtue of the passing of the Gateshead & District Tramways Act, 1950, the Gateshead & District Tramways Company has received power to abandon its tramways and replace them with motor bus services, and its name is changed to the Gateshead & District Omnibus Company.

Murex Limited.—The consolidated net profit of Murex Limited for the year ended April 30 amounted to £333,000, after providing £399,000 for tax, compared with £312,000 for the previous year, when the tax provision was £376,000. A final dividend is proposed of 6 per cent., making 10 per cent. for the year on capital increased by 100 per cent., equivalent to the 20 per cent. paid last year on the old capital.

Austrian Railway Tariffs.—The firm of Lep Transport Limited, Sunlight Wharf, Upper Thames Street, London, E.C.4, official freight agents to the Austrian State Railways, is in possession of a complete set of Austrian tariffs, and is now in a position to supply rates, free of charge, for all types of merchandise carried on the Austrian railways for goods destined for Austria or for goods in transit through Austria. The firm will welcome enquiries with a view to increasing traffic on the Austrian railways.

Charles Roberts & Company.—The consolidated net profits of Charles Roberts & Co. Ltd. for the year ended March 31 amounted to £118,323 (against £88,767 for the previous year). A final ordinary dividend is recommended of $12\frac{1}{2}$ per cent., making with the interim dividend of $7\frac{1}{2}$ per cent. a total distribution of 20 per cent. for the year. This is equal to the 30 per cent. paid for 1948-49, as in December last a 50 per cent. bonus issue was made, ranking for both the current and interim payments.

Thomas De La Rue & Company.—The group profit for the year ended April 1, 1950, of Thomas De La Rue & Co. Ltd. was £347,909, compared with £315,651 for 1948-49, after charging £126,429 (against £511,341) for tax and writing back £171,337 for reduction of the 1949-50 income-tax assessment on reconstruction of the group and tax reserves no longer required. Preference and ordinary dividends together absorb £136,950 net. The ordinary distribution is being maintained at 50 per cent. for the year with a final dividend of 35 per cent.

Euston Station Roof Renewal.—The London Midland Region of British Railways is half way through the task of re-glazing the roof over the departure platforms at Euston Station. The cost when finished will be £30,000. The glass was taken out of the roof at the beginning of the war as a precautionary measure, and the present work will provide 25 per cent. additional natural lighting than before. The covered area of all platforms and tracks is about 15,500 sq. yd., of which

British Railways Exhibit at Paisley



Interior of the British Railways pavilion at the Royal Highland Show at Paisley (see article in our July 21 issue)

OFFICIAL NOTICES

SITUATION VACANT.—District Traffic Superintendent. Salary £1,000 per annum. Knowledge of Spanish essential. Apply to Secretary, THE PERUVIAN CORPORATION LIMITED, 144, Leadenhall Street, London, E.C.3.

RAILWAY DRAUGHTSMEN required for design of Roller Bearing Axlebox Equipment for Locomotives and Rolling Stock. Please apply by letter to **BRITISH TIMKEN LIMITED**, Cheston Road, Aston, Birmingham, 7.

OLD-ESTABLISHED Rubber Company wish to appoint an Agent in London. Access to Railway Executive and Government Offices essential. Replies in confidence.—Box 781, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

DIRECTORY OF RAILWAY OFFICIALS & YEAR BOOK. A useful reference book for railway officers, engineering firms, and all who do business with railways. The only Directory which enables one to find the right railway and the right officer at the right moment. Issued July each year. Price 30s. net. Tothill Press Limited, 33, Tothill Street, London, S.W.1.

TRANSPORT ADMINISTRATION IN TROPICAL DEPENDENCIES. By George V. O. Bulkeley, C.B.E., M.I.Mech.E. With chapters on Finance, Accounting and Statistical Method. In collaboration with Ernest J. Smith, F.C.I.S., formerly Chief Accountant, Nigerian Government Railway. 190 pages. Medium 8vo. Full cloth. Price 20s. By post 20s. 6d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

GLOSSARY OF WOOD. A technical dictionary for all associated with timber and its uses. Ten thousand terms about timber—the common and the little known, the old and the new. Ten thousand definitions covering the entire field of timber and its uses—growth, marketing, utilisation. The commercial timbers, their qualities and uses, tools and working equipment, are all here explained simply, concisely and accurately. Illustrated by many clear line drawings. Price 21s. net. By post 21s. 9d. Tothill Press Limited, 33, Tothill Street, London, S.W.1.

INTERNATIONAL RAILWAY ASSOCIATIONS. Notes on the work of the various associations concerned with international traffic, principally on the European Continent. 2s. By post 2s. 2d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

11,000 sq. yd. will consist of large section corrugated asbestos sheeting and a glazed area of about 2,500 sq. yd., formed in aluminium patent glazing. Apertures are formed in the roof over the tracks for smoke emission. The whole of the work is being carried out to a strictly timed programme which was carefully planned before a start was made.

Institute of Transport Examinations.—The results of the Institute of Transport examinations held in May show that the number of candidates at 1,250 was greater than last year with more candidates in overseas centres. Among the eight candidates to whom honours were awarded were three railway and three road transport students.

Heavy Industrial Tractor.—A new heavy industrial tractor designed by Vickers Armstrongs Limited, will be available throughout the world by January, 1952. It will be powered by a Rolls-Royce diesel engine of 180 h.p. and will weigh between 14 and 15 tons. Extensive trials are now being made and production is expected to reach 500 tractors a year.

Southdown Motor Services Limited.—Presiding at the recent annual general meeting of Southdown Motor Services Limited, Mr. R. P. Beddow, Chairman & Managing Director, said that in accordance with their policy of co-ordination with the railways, only 10 per cent. of their services did not serve a railway station, and 87 per cent. of the railway stations within the area were served by their bus services. Regarding nationalisation of road passenger transport, he did not think that it could result in any benefit to the travelling public, and the last election had shown the public to be opposed to any further bus nationalisation proposals.

Institute of Transport: Beds., Cambs. & Hunts. Section.—The Beds., Cambs. & Hunts. Group of the Institute of Transport is to be reconstituted as a Section. The Group was formed in 1949. Mr. P. W. R. Marston-Clark, an Associate Member, convened a meeting on February 28 of that year of Corporate Members residing in the three counties; the chair was taken by Sir Alfred Faulkner. Licensing Authority for the Eastern Traffic Area and a member of the Institute, and Mr. C. S. A. Wickens, General Manager of Luton Corporation Transport and also a Member, spoke in support of the proposal to found a Group. During the 1949-50 session the Group held a full programme of meetings and visits, all well attended, and membership continued to grow. The inaugural meeting has been arranged for October 18, in Cambridge. Brig.-General Sir H. Osborne Mance, President of the Institute, will be present, and Mr. M. A. Cameron, Principal Traffic Officer, British Transport

Commission, and a Member of the Institute, will present a paper on "Transport in Perspective." Sir Alfred Faulkner will become first Chairman of the Section and Mr. Marston-Clark is continuing in office as Hon. Secretary.

Promoting Tourist Traffic to Britain.—Four red double-deck London buses are leaving London today (Friday) on a 4,000-mile tour of Europe to publicise the Festival of Britain to be held in 1951; each comprises an information bureau staffed by a representative of the British Travel & Holidays Association. Travel queries will be dealt with at the main stopping places and "Come to Britain" literature in several languages will be available for distribution.

B.S.A. Tools Limited: London and Leeds Offices.—As from August 1, the London office of the B.S.A. Tools group of companies will be at 93, Albert Embankment, S.E.11, telephone (machine tools) Reliance 2891 and (small tools) Reliance 3891. Immediate service will be given from this new address in the distribution of small tools and workshop accessories. Stocks of these are now held and showrooms are in course of completion for the accommodation of machine tools. An announcement regarding the opening of the latter will be made shortly. Meanwhile all enquiries from London and the south regarding machine tools and small tools supplied by the B.S.A. Tools group can be made to the latest address. The address of the Leeds office of the group is now 9, Mill Hill, Boar Lane, Leeds, telephone Leeds 22542.

Radio Traffic Control of Buses.—To facilitate economic provision of duplicate vehicles for day trippers to Surrey beauty spots, London Transport Country Bus & Coach Department has experimented on recent Sundays with a radio van in radio-telephonic contact with a control post at Dorking Bus Station, from which many relief vehicles normally run. The van tours popular spots; when it is seen that the next scheduled vehicle cannot clear a queue at any one point. Dorking Bus Station is informed by radio, and a relief vehicle is despatched, arriving in 15 minutes or less. Equipment used consists of a Pye 10-W. radio-telephone, employing a five-valve transmitter and an 11-valve receiver; the frequency range is 27-132 mc/s.

Institute of Metals Autumn Meeting.—The annual autumn meeting of the Institute of Metals will be held in Bournemouth on September 18-22. The autumn lecture will be given on September 18 by Mr. E. E. Schumacher, Chief Metallurgist of the Bell Telephone Laboratories Incorporated. Visits arranged include: the Pirelli Cable Works at Eastleigh; the Woolston marine

works of John I. Thornycroft & Co. Ltd.; the aircraft repair works at Eastleigh and seaplane works at Woolston of Vickers-Armstrongs Limited; the Southampton factories of Harland & Wolff Limited; and Wellworthy Piston Rings Limited iron foundries and laboratory at Ringwood and piston-ring factory at Lymington.

Institute of Transport 1951 Congress.—The Congress of the Institute of Transport in 1951 is to be held at Torquay; the date provisionally selected is June 13-15.

Bus Service Increases during the Past Year.—During the past year London Transport has carried out the largest programme of bus service improvements since the restoration in 1946 of the wartime cuts. Twelve new routes have been brought into operation and 16 routes extended. Peak-hour services on 76 routes have been strengthened. This has involved the bringing into service of 270 additional buses. So far improvements have been governed by the vehicle position. Further improvements, however, will depend more on the staff position, for at present London Transport needs another 200 drivers and 700 conductors. Every effort is being made to recruit these, including the lowering of the age limit to 19½ for conductors, and the raising of the upper recruitment limit for both drivers and conductors to 50.

United Railways of Havana.—Regarding the sale of the United Railways of Havana, to which reference was made in our May 19 issue, it is announced by the directors of the United Railways of Havana & Regla Warehouses Limited that negotiations with the prospective purchasers are at an end. It is stated that the purchasers had difficulty in making the necessary arrangements, one of which was to secure a decree of the Government of Cuba providing for operational conditions and payment of the transportation debt due to the company by that Government. Delays threatened to prolong negotiations indefinitely, and the Board gave the prospective purchasers a time limit which has expired. The Chairman is now visiting the U.S.A. to explore the possibility of negotiating with other parties, and it is proposed to hold the adjourned annual general meeting on his return.

Closing of Kennet & Avon Waterway.—At a recent meeting at Newbury of the Kennet & Avon branch of the Inland Waterways Association, held to consider the action of the Docks & Inland Waterways Executive of the British Transport Commission in closing a stretch of the Kennet & Avon navigation between Newbury and Reading because of the condition of the locks, it was stated that representations from the Association had brought no indication of when the water-

way would be reopened or when repairs would begin. A resolution was passed calling on the Docks & Inland Waterways Executive to carry out small repairs which would allow the locks to be reopened at once.

Buffer Stop Collision at Charing Cross.—Thirty passengers were slightly injured when the 6.51 a.m. electric train from Addiscombe crashed into the buffers at Charing Cross Station, Southern Region, on July 21. Nearly all the injured were treated at the first-aid post at the station. There was damage to the buffers and to the train, which was taken out of service.

New British Standard for Drills.—B.S. 328—Twist and Straight Flue Drills—was first published in 1928 and B.S. 985—Combined Drills and Countersinks—in 1941. Both are now combined in the revised edition of B.S. 328. The section dealing with twist drills has been amended and extended with special attention to the nomenclature and definitions of drill parts. Testing requirements have been brought up to date and the penetration capabilities of the drills modernised and extended. Copies may be obtained from the British Standards Institution, 24, Victoria Street, London, S.W.1, price 6s.

Anglo-Iranian Oil Company.—Sir William Fraser, Chairman & Managing Director, presided at the annual general meeting of the Anglo-Iranian Oil Co. Ltd., when a final dividend of 25 per cent. (making 30 per cent. for the year), less income tax, on the ordinary stock was approved. Lord Rotherwick, who proposed a vote of thanks to the Chairman, board, and staff, said that large amounts had been spent on new construction, and the Chairman's description of the research organisation meant that future developments were keeping pace with current activities.

Anglo-Argentine Tramways Company.—Presiding at the recent meeting of the Anglo-Argentine Tramways Co. Ltd., Mr. B. H. Binder said that the stipulated period for sale of the Buenos Aires Transport Corporation's assets expired on April 20 without any sale having taken place. An Argentine Minister recently had intimated to the British Ambassador that the whole problem of the Corporation was now under consideration by the Argentine Government. The Board therefore hoped that the Argentine Government would soon discuss the problem fully with them.

Road Transport Licences and Permits.—The validity of certain wartime emergency permits relating to public service vehicles and road passenger services, and to drivers and conductors of public service vehicles, which would otherwise expire on July 31, 1950, will be further extended under the Road Vehicles & Drivers Order, 1950, made by the Minister of Transport. The Order will come into force on August 1. The extensions are automatic and are intended to keep the authorisations effective until they can be reviewed and replaced where required by new licences. The Order also revokes the emergency powers hitherto granted to Regional Transport Commissioners to requisition horses or vehicles.

Forthcoming Meeting

August 9 (Wed.) to 19 (Sat.)—The Model Engineer Exhibition, at New Horticultural Hall, Vincent Square, London, S.W.1.

Railway Stock Market

After a rally towards the end of last week, stock markets have turned easier under the lead of British Funds, which were affected by fears that speeding up of rearmament means increased taxation. The latest war news from Korea also affected sentiment and earlier this week there was great caution in the markets. The only exception to the easier trend was provided by rearmament shares in which iron and steel, shipbuilding, aircraft, and machine tool shares participated. Although easier, declines in industrial shares were again small, and on balance have not exceeded more than a few pence at the time of going to press. In contrast to uncertainty in stock markets, a rising trend in metals and commodities has again been in evidence, particularly in the case of tin and rubber, which were influenced by fears of shortages if the U.S.A. decides to speed up stockpiling on any substantial scale.

With markets dull and uncertain, it is not surprising that there has been only very limited interest in foreign rails. Nevertheless in most cases quotations have been quite well maintained. An exception has been provided by United of Havana stocks, which fell heavily on official news of the breakdown of the take-over negotiations. Later, however, they strengthened a little on the possibility of a fresh offer from U.S.A. interests to take over the railway. The 1906 debentures were down to 13½ at one time and have since rallied to 15½. The Cuban stock fell to 42½ and 4½ per cent. Western debentures to 19. Canadian Pacifics have moved closely with dollar stocks, and eased to 29½, with the preference stock at 63. Manila issues were sold, but later firmed up, the "A" debentures to 60 and the preference shares to 6s. on suggestions that the U.S.A. may develop the Philippines into a big military base.

Antofagasta ordinary was steady at 6, but the preference stock eased to 39. Brazil Rail gold bonds were 39. Great Western of Brazil shares became less active, but steady at 15½. There were small irregular movements in Leopoldina stocks. The ordinary was 9½, the preference 26, the 4 per cent. debentures 94, and the 6½ per cent. debentures 133. Leopoldina Terminal de-

bentures were 88 and the ordinary units 1s. 3d. San Paulo 10s. units eased slightly to 15s. Among French railway sterling bonds Midi firmed up to 95½, but Orleans remained 95½. Nitrate Rails were 72s. 6d. and Taltal 14s. 9d. La Guaira Caracas ordinary was 67 and the 5 per cent. debentures 84.

Road Transport shares kept steady, with Southdown at 113s. 9d., West Riding 60s., Lancashire Transport 78s., and Maidstone & District around 89s. The 6½ per cent. preference 23s. 3d. B.E.T. deferred stock, after fluctuating, turned steadier, and strengthened to 440.

There was firmness among shares of locomotive builders and engineers. Charles Roberts were good at 86s., responding to the financial results and satisfaction with the 20 per cent. dividend payable on larger capital resulting from the 50 per cent. share bonus. Gloucester Wagon gained 1s. at 54s., North British Locomotive were steady at 16s. 10½d., with Vulcan Foundry at 19s. 9d., Beyer Peacock 22s. 3d., and Wagon Repairs 16s. 6d. Birmingham Wagon were 28s. 7½d. Hurst Nelson changed hands around 56s. 6d.; G.D. Peters 5s. shares kept at 17s.

Iron and steels have shown moderate gains because the rearmament drive will further increase demand for steel. It is pointed out in the market that iron and steel shares still offer attractive yields, and that rearmament may mean that the question of nationalisation may be further postponed.

Meanwhile, most yields are quite attractive, and there are confident expectations that dividends will be maintained. Moreover, current market prices are still substantially below the take-over prices fixed in the event of nationalisation. Beardmore have risen to 45s. 10½d., Colvilles to 35s. 3d., Stewarts and Lloyds to 55s. 9d., United Steel to 27s. 3d., and Thomas & Baldwins to 14s. Babcock & Wilcox at 63s. 3d. were again higher. Clarke Chapman 53s. 1½d. and Vickers improved to 30s. 3d. Guest Keen were up to 45s. 9d. T. W. Ward rose to 63s., and B.S.A. to 29s. 9d., the latter being influenced by higher dividend possibilities.

Traffic Table of Overseas and Foreign Railways

	Railway	Miles open	Week ended	Traffics for week		No. of week	Aggregate traffics to date			
				Total this year	Inc. or dec. compared with 1948/49		Total	Increase or decrease		
							1949/50			
South & Central America				£			£		£	
	Antofagasta	811	15.7.50	76,730	—	2,160	28	1,674,284	—	187,240
	Costa Rica	281	May, 1950	c1,034,427	—	c46,785	48	c9,483,848	—	c1,726,592
	Dorada	70	June, 1950	23,781	+	2,219	26	231,172	+	60,567
	Inter. Ctl. Amer.	794	May, 1950	\$1,083,611	—	\$8,330	21	\$5,914,799	+	\$466,171
	La Guaira	223	June, 1950	\$58,956	—	\$36,630	26	\$503,317	+	\$148,198
	Nitrate	382	15.7.50	18,801	—	723	28	255,421	—	16,254
	Paraguay Cent.	274	14.7.50	/193,364	+	/55,316	2	/403,674	+	/92,440
	Peru Corp.	1,050	June, 1950	\$6,883,000	+	\$2,164,878	52	\$71,217,058	+	\$20,580,508
	“(Bolivian Section)”	66	June, 1950	Bs. 4,067,000	—	Bs. 3,531,834	52	Bs. 110,749,664	+	Bs. 7,004,490
Canada	Salvador	100	Apr., 1950	c148,000	—	c34,000	43	c1,624,000	—	c166,000
	Taltal	154	June, 1950	19,090	+	7,235	52	173,510	+	61,900
Canada	Canadian National†	23,473	May, 1950	15,845,000	+	2,450,000	21	69,391,000	+	3,999,000
	Canadian Pacific†	17,037	May, 1950	10,674,000	+	517,000	21	48,324,000	—	395,000
Various	Barsi Light*	167	June, 1950	30,675	+	6,502	13	90,937	—	2,242
	Egyptian Delta	607	31.5.50	18,022	—	1,930	9	104,633	—	12,906
	Gold Coast	536	May, 1950	256,113	+	27,427	9	484,862	+	30,111
	Mid. of W. Australia	277	May, 1950	35,409	+	5,286	48	345,258	+	23,758
	Nigeria	1,900	Jan., 1950	502,360	+	38,978	44	5,017,814	+	266,573
	South Africa	13,347	7.5.50	1,662,032	+	112,939	15	20,791,641	+	1,576,817
	Victoria	4,744	Mar., 1950	1,974,774	+	426,993	39	—	—	—

* Receipts are calculated at 1s. 6d. to the rupee

† Calculated at \$3 to £1